

1900

Nason  
Manufacturing  
Company.



71 Beekman Street,  
New York.

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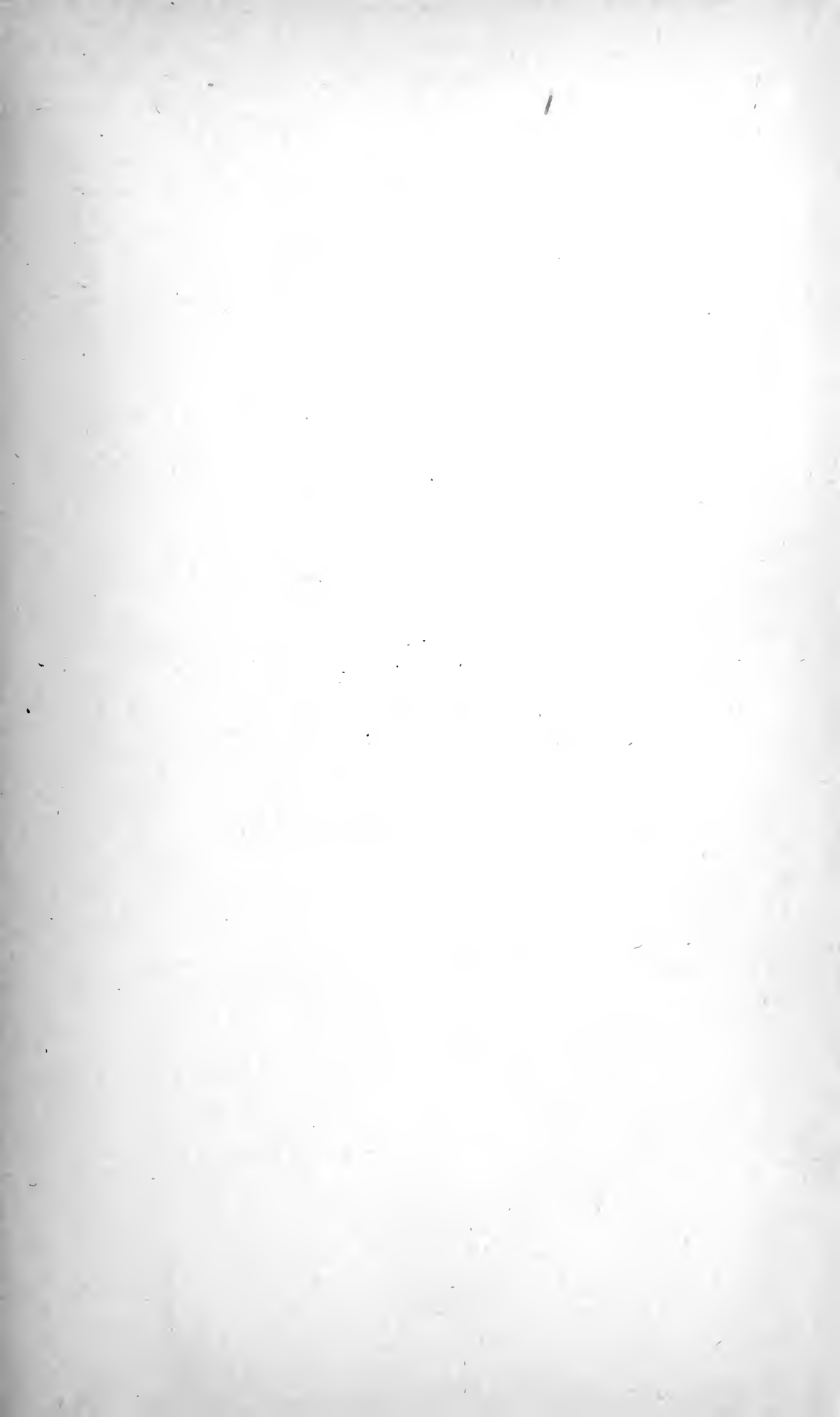
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UNITED STATES OF AMERICA.







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NASON MANUFACTURING Co.,

71 BEEKMAN STREET, NEW YORK.

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CABLE ADDRESS: UNITORGAN, NEW YORK.  
A. B. C. CODE.

ILLUSTRATED LISTS OF PRICES

—FOR—

WROUGHT AND CAST IRON PIPE,

ETC.,

Brass and Iron Valves and Fittings,

—AND—

GENERAL SUPPLIES FOR STEAM, GAS, WATER,  
AMMONIA, AND OIL.

---

Steam and Gas Fitters,' and Plumbers' Tools  
and Supplies.

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STEAM AND HOT WATER HEATING SPECIALTIES.

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JANUARY, 1900.

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FOR  
GENERAL AND PRACTICAL INFORMATION  
PERTAINING TO  
STEAM AND HOT-WATER HEATING

SEE PAGES 382 to 416.

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NASON MANUFACTURING Co.,  
NEW YORK.

2756  
Jan. 30. 1900.

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**A**N EXPERIENCE of more than half a century, which this company and its founders have had with various Steam Engineering Specialties, including the horizontal tubular boiler, the globe valve, the taper screwed joint, and the free end vertical tube radiator, all of which were devised by the late Joseph Nason, should enable its present officers, without egotism, to speak with some authority as to the merit of goods both manufactured and sold by them, and of the care which has been used in the preparation of the present catalogue.

From the very large list of materials made for steam fitters' and plumbers' use, the best only of their kind have been selected for book illustration, and none other will be offered for sale or delivery. The past business policy of the NASON MANUFACTURING COMPANY having been to fully guarantee the quality of all goods sold, customers may rely upon a continuance of the same methods, and all articles which may be found in any way unsatisfactory, or not as represented at the time of sale, may be returned and the cost of transportation charged.

Especial attention is directed to the Nason patented specialties, including particularly the well known "Equator" and "Gulf-Stream" Heaters, which, after several seasons of severe trial under all possible conditions of service, are generally recognized as the best of their class. For this season's delivery, they have been still further improved, if not perfected, by the addition of an entirely new shaking and dumping grate, devised by Mr. Nason especially for them. Of this, full illustration will be found, and these grates will fit heaters of previous manufacture.

It is unpleasant, though necessary, to again have to warn the trade, and steam users in general, that several of the specialties originated and made by this company have been cheaply imitated by competitors lacking sufficient originality to design their own wares. An examination of the latter will invariably show them to be rough in workmanship, notably light in weight, and distinctly unfit for such wear and tear as come from the high pressures incident to modern steam engineering.

This is notably true of Steam Traps. See that the name "Nason" appears upon them, and reject all others. This name belongs to NASON MANUFACTURING COMPANY by right, and if Traps other than those of its make are sold as "Nason" Traps, the sellers render themselves liable to action for selling goods under false representation.

To those contemplating the installation of any kind of apparatus, it may be said that the extended knowledge gained by long experience of the company's staff of engineers makes it often possible for them to be of assistance by advice or suggestion, and such counsel will be always freely and willingly given when wanted.

Tables have been introduced in the latter pages of the book which may frequently be found valuable if used.

Many thanks are extended to friends and patrons of the past, and the good will of those whose acquaintance we may make in the future is earnestly hoped for by

Faithfully yours,

NASON MANUFACTURING COMPANY.

71 Beekman Street,  
January, 1900.



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## SPECIAL NOTICE.

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A large and complete assortment of standard goods is carried in stock at all times. Special articles will be made to order on the shortest possible notice.

All agreements are contingent upon strikes, delays of carriers, and other causes unavoidable, or beyond our control.

Orders for special goods, not suitable for general stock, cannot be countermanded.

Goods returned will be received and credited only under our written consent.

Orders by telegraph and telephone are accepted at sender's risk.

NASON MANUFACTURING COMPANY.

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**THIS CATALOGUE SUPERSEDES ALL OF EARLIER DATE**

## WILL CUSTOMERS KINDLY NOTE THAT:

Business misunderstandings will be avoided and correspondence lessened by reading the following:

1. All lists and discounts are subject to market changes; but so far as possible customers will be promptly informed of variation in prices.
2. Quotations made will be held open for acceptance for ten days only; after which, should an advance occur, the agreement to sell at the price named terminates.
3. Terms, cash within thirty days, unless specifically agreed otherwise.
4. Instructions for shipping should be full and the line specified; when not given, goods will be sent by the most direct route.
5. Boxing, Crating, and Cartage will be charged for at cost.
6. As all goods sent out will be carefully examined, counted, and packed by experienced employees only, responsibility for loss or breakage ceases on delivery to shipping agents, and claims, therefore, must be made on the carrier.
7. Insurance will not be placed on shipments unless requested.
8. Customers will protect their interests by examining goods, when possible, to ascertain if they have been damaged in transit, before signing any receipt for them.
9. Claims for corrections, to receive attention, should be made within ten days after goods are received.
10. Business correspondence, to secure prompt attention, should be addressed, not to its officers or employees, but to the—

**NASON MANUFACTURING COMPANY.**

JANUARY, 1900.

ESTABLISHED BY JOSEPH NASON IN 1841.

INCORPORATED IN 1884.

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CARLETON W. NASON, President.

JOHN H. CHASMAR, Vice-President.

FRANK A. BUCKNAM, Treasurer.

ARTHUR DE L. NEAL, Secretary.

TELEGRAPHIC CODE.

For convenience of our customers, we have adopted the following CIPHER for ordering PLAIN AND GALVANIZED WROUGHT IRON PIPE BY TELEGRAPH:

Number of Feet.		Size.	Black.	Size.	Galvanized.
25	Africa	1/8	Allegheny	1/4	Amazon
50	Alabama	1/4	Baltimore	3/8	Bay
75	Cu ba	3/8	Camden	1/2	Colorado
100	Asia	1/2	Detroit	3/4	Danube
200	Belgium	3/4	Erie	1	Elbe
300	Chili	1	Fairmount	1 1/4	Firth
400	Denmark	1 1/4	Galena	1 1/2	Ganges
500	Egypt	1 1/2	Harrisburgh	2	Hudson
600	France	2	Ithaca	2 1/2	Indus
700	Germany	2 1/2	Jamestown	3	Juniata
800	Holland	3	Kensington	3 1/2	Kanawah
900	Ireland	3 1/2	Lancaster	4	Lake
1,000	Japan	4	Macon	4 1/2	Miami
1,500	Jersey	4 1/2	Quincy	5	Nile
2,000	Kentucky	5	Newark	6	Osage
2,500	Kansas	6	Oneida	7	Po
3,000	Liberia	7	Paris	8	Rhine
3,500	Lapland	8	Reading	9	Seine
4,000	Maine	9	Salem	10	Tweed
4,500	Mexico	10	Troy	.....	.....
5,000	Nevada	11	Utica	.....	.....
6,000	Ohio	12	Venice	.....	.....
7,000	Peru				
8,000	Russia				
9,000	Spain				
10,000	Texas				
15,000	Tennessee				
20,000	Uruguay				
25,000	Utah				
50,000	Venezuela				
100,000	Wyoming				
GENERAL TERMS.					
		Behoof.....	Wrought Iron Pipe.		
		Belabor.....	Butt Black.		
		Belate.....	Lap Black.		
		Beldam.....	Butt Galvanized.		
		Belfry.....	Lap Galvanized.		
		Bellyfull.....	Boiler Tubes.		

Edna.....	Ship via Cheapest Route.
Mabel.....	Ship via Rail.
Louise.....	Ship via Canal.
Mattie.....	Ship via Steamer.
Julia .....	Ship via Express.
Acorn.....	At what price can you furnish?
Branch... ..	At what price and how soon can you furnish?
Gate.....	When can you ship?
Carrie.....	To-day Sure.

EXAMPLES: Ship via rail, 500 ft. 2 in. Plain Pipe; for this, telegraph MABEL EGYPT ITHACA.  
Or, at what price can you furnish 100 ft. 1 1/4 in. Galvanized Pipe? for this, telegraph ACORN ASIA FIRTH.  
By this plan mistakes by operators are prevented, and economy of words assured.



## LAP-WELDED AMERICAN CHARCOAL IRON BOILER TUBES.

Diameter Outside.	Price Per Foot.	Thick- ness.	Thickness nearest Bgm.W. G.	Nominal Weight Per Foot.	Diameter Outside	Price Per Foot.	Thick- ness.	Thickness nearest Bgm.W. G.	Nominal Weight Per Foot.
Inches.		Inches.		Pounds.	Inches.		Inches.		Pounds.
1	.37	.095	13	.90	4½	.69	.134	10	6.17
1¼	.35	.095	13	1.15	5	.82	.148	9	7.58
1½	.32	.095	13	1.40	6	1.08	.165	8	10.16
1¾	.32	.095	13	1.66	7	1.33	.165	8	11.90
2	.30	.095	13	1.91	8	1.70	.165	8	13.65
2¼	.36	.095	13	2.16	9	2.25	.180	7	16.76
2½	.36	.109	12	2.75	10	2.76	.203	6	21.00
2¾	.39	.109	12	3.04	11	3.30	.220	5	25.00
3	.39	.109	12	3.33	12	3.77	.229	4½	28.50
3¼	.45	.120	11	3.96	13	4.43	.238	4	32.06
3½	.48	.120	11	4.28	14	5.04	.248	3½	36.00
3¾	.55	.120	11	4.60	15	5.87	.259	3	40.60
4	.60	.134	10	5.47	16	6.50	.270	2½	45.20

### NET PRICES OF EXTRA GAUGES OF BOILER TUBES.

*To take the place of all previous lists, and subject to change without notice.*

For EXTRA wire gauge "Boiler Tubes" away from standard not exceeding four wire gauges, add one cent for each inch in diameter to the net price per foot for each additional number. To calculate price, take discounts from list prices of regular tubes, and add thereto net charge for extra wire gauge, thus:

For 1 Number.	For 2 Numbers.	For 3 Numbers.	For 4 Numbers.
2 inch.....2 cts.	2 inch.....4 cts.	2 inch.....6 cts.	2 inch..... 8 cts.
2¼ " .....2¼ "	2¼ " .....4½ "	2¼ " .....6¾ "	2¼ " ..... 9 "
2½ " .....2½ "	2½ " .....5 "	2½ " .....7½ "	2½ " .....10 "

Beyond four numbers, price is per pound.

Swaging or swelling 2 inch or 2¼ inch Tubes, 5 cents per end extra.

### SAFE ENDS.

Net prices for Safe Ends to 6 inches long, inclusive. Over 6 inches, and not exceeding 12 inches long, the extra length will be charged for in same proportion. Longer than 12 inches from regular Tube List.

Size.....	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4	4½	5	6
Each End, .13	.13	.13	.13	.13	.13	.14	.16	.18	.20	.22	.25	.27	.29	.32	.37	.45

These prices for Safe Ends govern up to No. 10 Bgm. W. G. Beyond that an extra charge will be made at rate of one cent per each inch in diameter for each Extra Gauge per Safe End.

### HYDRAULIC TUBES.

¼ inch thick or under.....	10 cents per pound.
¼ inch to ¾ inch thick.....	12 " "

Over ¾ of an inch thick, special prices.

The above prices are for tubes up to 20 feet long—for tubes in excess of that length, ten per cent. will be added to net of invoice.

Extra thickness of tubes will be charged as per list of Extra Gauges.

STANDARD  
WROUGHT IRON PIPE.

ADOPTED FEBRUARY 22, 1899.

Internal Diameter Nominal.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Plain, price per foot .....	.08 $\frac{1}{2}$	.08 $\frac{1}{2}$	.08 $\frac{1}{2}$	.10 $\frac{1}{2}$	.11 $\frac{1}{2}$	.16 $\frac{1}{2}$	.22
Galvanized, " .....	.18	.16	.16	.17	.19	.26	.36
Weight, per foot, plain, lbs., nominal.....	.24	.42	.56	.84	1.12	1.67	2.24

Int'al Dia. Nom'l	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	11	12
Plain, price p. ft.	.27	.36	.57	.75	.93	1.07	1.40	1.55	1.95	2.53	2.95	3.80	4.50		
Galvanized, " "	.44	.59	.91	1.20	1.60	1.75	2.30	2.55	3.20	4.30	5.20				
W'g't, p. ft. plain lbs. nominal..	2.68	3.61	5.74	7.54	9.00	10.66	12.34	14.50	18.76	23.27	28.18	33.76	40.02	45.00	49.00

Wrought Iron Pipe Cut and Fitted from Plans or Specifications furnished.  
Wrought Iron Pipe.—See next page for dimensions, capacities, etc.

EXTRA STRONG AND DOUBLE EXTRA STRONG  
WROUGHT IRON WELDED PIPE.

Nominal Diameter.	Actual Outside Diam.	Thickness, Extra Strong.	Thickness, Double Extra Strong.	Actual Inside Diam. Extra Strong.	Actual Inside Diam. Double Extra Strong.	Price, per Foot, Extra Strong.	Price, per Ft. Double Extra Strong.
Inches.	Inches.	Inches.	Inches.	Inches.	Inches.		
$\frac{1}{8}$	0.405	0.100	.....	0.205	.....	.22	
$\frac{1}{4}$	0.54	0.123	.....	0.294	.....	.17	
$\frac{3}{8}$	0.675	0.127	.....	0.421	.....	.17	
$\frac{1}{2}$	0.84	0.149	0.298	0.542	0.244	.19	.50
$\frac{3}{4}$	1.05	0.157	0.314	0.736	0.422	.20	.60
1	1.315	0.182	0.364	0.951	0.587	.29	.75
$1\frac{1}{4}$	1.66	0.194	0.388	1.272	0.885	.39	.85
$1\frac{1}{2}$	1.9	0.203	0.406	1.494	1.088	.48	1.10
2	2.375	0.221	0.442	1.933	1.491	.63	1.60
$2\frac{1}{2}$	2.875	0.280	0.560	2.315	1.755	1.15	2.30
3	3.5	0.304	0.608	2.892	2.284	1.50	3.25
$3\frac{1}{2}$	4.0	0.321	0.642	3.358	2.716	1.90	4.20
4	4.5	0.341	0.682	3.818	3.136	2.15	4.85

Extra and Double Extra Strong Wrought Iron Pipe is furnished with plain ends, and is threaded only when so ordered.

SPECIAL TUBING.

We are prepared to furnish special tubing of any practicable internal or external diameter or thickness.

Such special tubing is made usually to sample or specification.

Price per pound will be quoted on application, based upon current cost at time of inquiry.

# WROUGHT IRON WELDED PIPE.

FOR STEAM, GAS, WATER OR OIL.

TABLE OF STANDARD SIZES.

Inside Diameter. Nominal.	Actual Outside Diameter.	Thickness.	External Circumference.	Length of Pipe, per Square Foot of Outside Surface.	Actual Internal Area.	External Area.	Length of Pipe containing one Cubic Foot.	Nominal Weight per Foot Lbs.	No. of Threads per inch of Screw.
1/8	.405 in.	.068 in.	1.272 in.	9.44 ft.	.0572 in.	.129 in.	2500.	.24	27
1/4	.54 "	.088 "	1.696 "	7.075 "	.1041 "	.229 "	1385.	.42	18
3/8	.675 "	.091 "	2.121 "	5.657 "	.1916 "	.358 "	751.5	.56	18
1/2	.84 "	.109 "	2.652 "	4.502 "	.3048 "	.554 "	472.4	.84	14
3/4	1.05 "	.113 "	3.299 "	3.637 "	.5333 "	.866 "	270.	1.12	14
1	1.315 "	.134 "	4.134 "	2.903 "	.8627 "	1.357 "	166.9	1.67	11 1/2
1 1/4	1.66 "	.140 "	5.215 "	2.301 "	1.496 "	2.164 "	96.25	2.24	11 1/2
1 1/2	1.9 "	.145 "	5.969 "	2.01 "	2.038 "	2.835 "	70.65	2.68	11 1/2
2	2.375 "	.154 "	7.461 "	1.611 "	3.355 "	4.430 "	42.36	3.61	11 1/2
2 1/2	2.875 "	.204 "	9.032 "	1.328 "	4.783 "	6.491 "	30.11	5.74	8
3	3.5 "	.217 "	10.996 "	1.091 "	7.388 "	9.621 "	19.49	7.54	8
3 1/2	4. "	.226 "	12.566 "	.955 "	9.837 "	12.566 "	14.56	9.00	8
4	4.5 "	.237 "	14.137 "	.849 "	12.730 "	15.904 "	11.31	10.66	8
4 1/2	5. "	.247 "	15.708 "	.765 "	15.939 "	19.635 "	9.03	12.34	8
5	5.563 "	.259 "	17.475 "	.629 "	19.990 "	24.299 "	7.20	14.50	8
6	6.625 "	.280 "	20.813 "	.577 "	28.889 "	34.471 "	4.98	18.76	8
7	7.625 "	.301 "	23.954 "	.505 "	38.737 "	45.663 "	3.72	23.27	8
8	8.625 "	.322 "	27.096 "	.444 "	50.039 "	58.426 "	2.88	28.18	8
9	9.688 "	.344 "	30.433 "	.394 "	63.633 "	73.715 "	2.26	33.76	8
10	10.75 "	.366 "	33.772 "	.355 "	78.838 "	90.762 "	1.80	40.02	8
11	12. "	.375 "	37.699 "	.318 "	99.402 "	113.098 "	1.46	45.95	8
12	12.75 "	.375 "	40.055 "	.299 "	113.098 "	127.677 "	1.27	48.99	8
13	14. "	.375 "	43.982 "	.273 "	137.887 "	153.938 "	1.04	53.92	8
14	15. "	.375 "	47.124 "	.255 "	159.485 "	176.715 "	.90	57.89	8
15	16. "	.375 "	50.265 "	.239 "	182.655 "	201.062 "	.79	61.77	8

PRICE FOR PIPE CUTTING.

(ONE CUT AND THREAD.)

Size, inches,	1⁄8	1⁄4	3⁄8	1⁄2	3⁄4	1	1 1⁄4	1 1⁄2	2	2 1⁄2	3	3 1⁄2
Price.....	.06	.06	.06	.06	.06	.06	.08	.10	.14	.20	.30	.40

Size, inches.	4	4 1⁄2	5	6	7	8	9	10	12	14	15	16
Price.....	.40	.50	.60	.80	1.00	1.20	2.00	2.50	3.50	6.00	6.50	7.00

Price for Cutting Extra Strong Pipe, double above rates.  
Price for Cutting Double Extra Strong Pipe, three times above rates.

HEAVY DRIVE WELL PIPE.

WITH THE ALLISON PATENT VANISHING THREAD.

Diameter, Inside.	Weight Per Foot.  Pounds.	Full Lengths. Per Foot.		Half Lengths. Per Foot.		Third Lengths. Per Foot.		Fourth Lengths. Per Foot.	
		Black.	Galvan'ed.	Black.	Galvan'ed.	Black.	Galvan'ed.	Black.	Galvan'ed.
1 1⁄4	3.00	.17	.22	.19	.27	.21	.29	.22	.31
1 1⁄2	3.63	.17	.23	.19	.29	.21	.31	.22	.33
2	5.00	.22	.30	.24	.37	.26	.39	.28	.41
2 1⁄2	5.74	.24	.34	.27	.43	.30	.46	.33	.49
3	7.54	.30	.44	.33	.53	.37	.57	.40	.62
3 1⁄2	9.00	.36	.52	.41	.66	.47	.72	.53	.78
4	10.66	.43	.61	.48	.77	.54	.84	.60	.91
4 1⁄2	12.34	.51	.72	.58	.91	.64	.99	.71	1.07
5	14.50	.59	.84	.67	1.09	.75	1.22	.83	1.35
6	18.76	.74	1.06	.83	1.36	.92	1.48	1.01	1.61
7	23.27	.98	1.38	1.15	1.78	1.32	1.98	1.50	2.17
8	28.18	1.15	1.61	1.32	2.07	1.49	2.27	1.67	2.46

Full lengths range from 18 to 20 feet.	Third lengths range from 6 to 7 feet.
Half “ “ “ 9 to 10 “	Fourth “ “ “ 4 ft. 6 in. to 5 feet.

Each length is fitted with one coupling without extra charge.

STANDARD FULL WEIGHT DRIVE PIPE.

Cut in lengths 3 feet to 9 feet long, and threaded specially so that the ends of pipe will butt together when screwed up ; with Patent Sockets.

SPECIALLY ADAPTED FOR DRIVEN WELLS.

Nominal Inside Diameter. Inches.	Price per Foot.	Weight per Foot. Pounds.	Actual Outside Diameter. Inches.	No. of Threads per inch of Screw.
1 1⁄4	.20	2.25	1.66	11 1⁄2
1 1⁄2	.25	2.69	1.90	11 1⁄2
2	.28	3.61	2.37	11 1⁄2
2 1⁄2	.36	5.74	2.87	8
3	.45	7.54	3.50	8



# CAST IRON BELL AND SPIGOT PIPE,

FOR WATER AND GAS, SEWERAGE, CULVERTS, ETC.

Diameter.	GAS PIPE.				WATER PIPE.				Lead Per Joint. Pounds.	Hemp Per Joint. Ounces.	Diameter. Inches.
	GAS PIPE.		Head, 100 feet. Pressure, 43 lbs.		Head, 200 feet. Pressure, 86 lbs.		Head, 300 feet. Pressure, 130 lbs.				
	Thickness.	Weight.	Thickness.	Weight.	Thickness.	Weight.	Thickness.	Weight.			
1	.26	16	.26	16	.26	16	.26	16	2.00	1.3	1
1 1/4	.26	20	.26	20	.26	20	.26	20	2.25	1.5	1 1/4
1 1/2	.26	36	.26	36	.26	36	.26	36	2.75	1.75	1 1/2
2	.31	54	.36	63	.41	72	.45	81	3.25	2.25	2
2 1/2	.31	72	.36	81	.41	90	.45	99	3.90	2.5	2 1/2
3	.31	132	.38	167	.41	177	.45	200	4.40	2.8	3
4	.38	186	.40	230	.42	243	.45	260	5.50	3.5	4
5	.40	240	.42	295	.45	315	.48	338	6.80	4.4	5
6	.40	300	.43	364	.47	393	.51	426	8.00	5.0	6
8	.44	456	.46	513	.51	567	.56	624	11.50	7.0	8
10	.44	600	.50	685	.56	765	.62	852	14.50	8.5	10
12	.46	696	.53	870	.60	985	.68	1110	18.00	11.0	12
14	.53	960	.56	1074	.65	1229	.73	1399	21.50	13.0	14
16	.56	1200	.60	1293	.69	1496	.79	1723	24.00	15.0	16
18	.63	1500	.63	1532	.74	1788	.85	2065	27.00	16.0	18
20	.63	1680	.66	1788	.78	2104	.91	2444	31.50	20.0	20
24	.73	2359	.75	2407	.87	2803	1.02	3290	37.00	24.0	24
30	.84	3300	.87	3482	1.01	4027	1.19	4783	51.00	33.0	30
36	.95	4500	.98	4699	1.14	5460	1.36	6543	75.00	48.0	36
40	1.05	5400	1.09	5807	1.23	6525	1.48	7858	85.00	54.0	40
42	1.07	5700	1.10	6147	1.28	7100	1.54	8568	90.00	58.0	42
48	1.15	7200	1.25	7982	1.41	8946	1.71	10857	110.00	70.0	48
60	1.25	9962	1.40	11000	1.62	13000	1.83	15000	150.00	100.0	60

1 in. and 1 1/4 in. in 6 ft. lengths; 1 1/2 and 2 in. in 9 ft. lengths; 3 in. and upwards in 12 ft. lengths.

Weights for Lead and Hemp are approximate only.

Full assortment all regular sizes usually in stock.

All standard length Hub and Spigot Water and Gas Pipe sold by the ton; prices based on quantities, or lowest rates current at time of purchase.

Hub and Spigot Specials, Elbows, Tees, Crosses, Reducers, Increases, and reducing specials for all sizes and pressures furnished promptly at lowest price per pound current at time of purchase.

Flanged Cast Iron Pipe and Specials quoted on application.

Inquiries should state sizes, approximate quantities and weights of pipes, or pressures under which they will be used, and if possible, deliveries desired.

LIGHT WROUGHT IRON ARTESIAN, SALT, OIL AND GAS  
WELL CASING,  
With Screw and American Patent Protecting Sleeve Socket.  
Also with Inserted Joint.

Nominal Inside Diameter.	Price per Foot.	Actual Outside Diameter.	Thickness Nearest Bmg. W. G.	Nominal Weight Per Foot.	No. of Threads per In. of Screw.
Inches.		Inches.		Pounds.	
2½	.32	2¾	12	3.13	14
2¾	.34	3	12	3.45	14
3	.37	3¼	11	4.10	14
3¼	.40	3½	11	4.45	14
3½	.43	3¾	11	4.78	14
3¾	.49	4	10	5.56	14
4	.54	4¼	10	6.00	14
4¼	.56	4½	10	6.36	14
4½	.58	4¾	10	6.73	14
4¾	.63	5	9	7.80	14
5	.65	5¼	9	8.20	14
5½	.67	5½	9	8.62	14
5¾	.76	6	8	10.46	14
6¼	.91	6½	8	11.58	14
6¾	1.00	7	8	12.34	14
7¼	1.07	7½	8	13.55	14
7¾	1.30	8	7	15.41	11½
8¼	1.43	8½	7	16.07	11½
8¾	1.60	9	7	17.60	11½
9½	1.90	10	6	21.90	11½
10¼		10¾	5	25.80	11½
10¾		11	5	26.72	11½
11½		12	4½	30.35	11½
12½		13	3½	33.78	11½
13½		14	2½	42.02	11½
14½		15	2	47.66	11½
15½		16	2	51.47	11½

Intermediate sizes of Casing not on list, charged at price of next regular larger size.

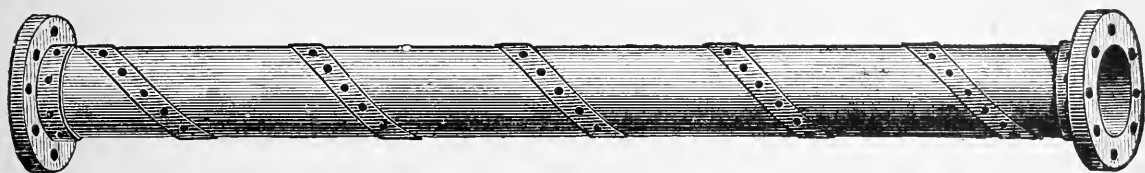
SPECIAL AND HEAVY WROUGHT IRON ARTESIAN, SALT, OIL AND GAS  
WELL CASING,  
With Screw and Socket or with Inserted Joint.

Nominal Inside Diameter.	Price per Foot.	Actual Outside Diameter.	Thickness Nearest Bmg. W. G.	Nominal Weight Per Foot.	No. of Threads per In. of Screw.
Inches.		Inches.		Pounds.	
4	Prices on Application	4¼	6	9.00	14
4¼		4½	6	9.38	14
4½		4¾	6½	9.39	14
5		5¼	7	9.86	14
5		5½	4	12.80	11½
5		5¾	1	15.88	11½
5½		5½	5	12.49	11½
5¾		6	6½	12.04	11½
5¾		6	4½	14.20	11½
5¾		6	2½	16.70	11½
6¼		6½	6½	13.32	14 & 11½
6¼		6½	3½	17.02	11½
6¾		7	4	17.51	11½ & 10
7½		8	4	20.17	11½
8¼		8½	5	20.10	11½
8¼		8½	2½	24.38	11½ & 8
10¼		10¾	2	32.80	8

Table of Outside Diameters of Bell of Inserted Joint Standard Weight Casing.

Casing	Nominal I. D. ....	2	2¼	2½	2¾	3	3¼	3½	3¾	4	4¼	4½	4¾	5
Bell	Actual O. D. ....	2⅜	2⅝	2⅞	3	3⅛	3¼	3½	3⅝	4	4⅛	4½	4⅞	5⅛
Casing	Nominal I. D. ....	5⅜	5⅝	6¼	6⅝	7¼	7⅝	8¼	8⅝	9⅝	10⅝	11⅝		
Bell	Actual O. D. ....	5¾	6¼	6⅞	7⅞	8⅞	9⅞	10⅞	11⅞	12⅞				

## DOUBLE GALVANIZED SPIRAL RIVETED FLANGED PRESSURE PIPE.

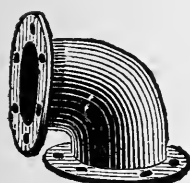


Made of Galvanized Iron, and Re-Galvanized after formation, thereby making all Seams and Laps perfectly solid.

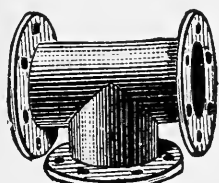
Each length tested to 150 pounds hydraulic pressure, suitable for exhaust steam, exhaust-steam heating, pump suction, pump columns, compressed air, refrigerating pipe, etc.

Inside Diameter, inches. . . . .	3	4	5	6	7	8	9	10	12	14	16	18	20
Price per Foot, includ. Flanges.	.50	.70	1.00	1.20	1.40	1.70	2.00	2.60	3.15	4.00	5.15	6.40	7.95
Thickness, Birm'gh'm Gauge. No.	20	20	20	18	18	18	18	16	16	14	14	14	14
Nominal Weight per foot, lbs. . .	2 1/4	3	4	5	6	7	8	11	14	20	24	29	34

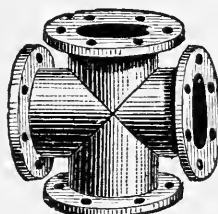
## GALVANIZED CAST AND WROUGHT IRON FIT- TINGS, FOR FLANGED SPIRAL PIPE.



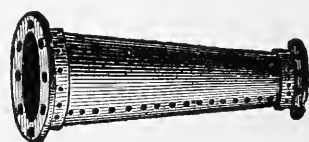
ELBOW.



TEE.



CROSS.



REDUCER.

Inside Diameter.	Elbows.	Tees.	Crosses.	Reducers	Flanges.	Disks or Blind Flanges.	Bolts and Nuts.	Composition Gaskets.
3 in.	1.60	2.75	4.15	.....	.39	.45	.04	.09
4 "	2.10	3.25	5.30	* 3.00	.52	.65	.04	.10
5 "	2.85	4.40	6.70	* 3.50	.65	.78	.04	.12
6 "	4.10	5.70	8.00	* 4.75	.78	1.17	.04 1/2	.16
7 "	5.10	7.30	11.00	* 5.50	1.04	1.56	.04 1/2	.18
8 "	6.70	9.80	14.25	* 6.50	1.17	1.82	.04 1/2	.23
9 "	9.00	13.80	18.80	* 8.00	1.56	2.34	.04 1/2	.31
10 "	10.00	17.60	24.50	* 10.25	1.82	2.47	.04 1/2	.40
11 "	*13.00	*20.00	*26.50	*12.00	1.95	3.25	.04 1/2	.45
12 "	15.80	22.50	30.00	*13.00	2.08	3.90	.04 1/2	.50
13 "	19.15	*25.00	*33.50	*14.60	2.34	4.55	.04 1/2	.56
14 "	*22.30	*30.50	*38.00	*16.50	2.60	5.46	.05	.63
15 "	26.00	*37.00	*45.00	*18.40	3.12	5.98	.05	.75
16 "	*30.00	*44.00	*53.00	*21.30	4.42	6.76	.05	.90
18 "	*34.00	*50.00	*59.00	*26.00	5.07	9.10	.05	1.08
20 "	*38.50	*56.00	*67.00	*29.40	5.59	11.70	.05	1.25

\*All Fittings marked thus are riveted sheet iron, all others are cast iron.

Fittings of any design made to order.

The Flanges can be tapped to suit Wrought Iron Pipe if required.

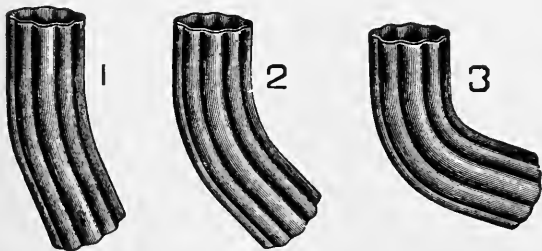
CORRUGATED LEADER PIPE, ELBOWS AND SHOES.



ROUND GALVANIZED EXPANDING CONDUCTOR.

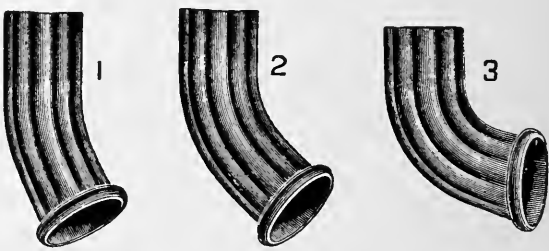
2 inch, per foot	.....	.13
3 " " "	.....	.15
4 " " "	.....	.20
5 " " "	.....	.25
6 " " "	.....	.30

ROUND ELBOWS.



2 inch Round Elbows	.....	.25
3 " " "	.....	.30
4 " " "	.....	.40
5 " " "	.....	.50
6 " " "	.....	.60

ROUND SHOES.



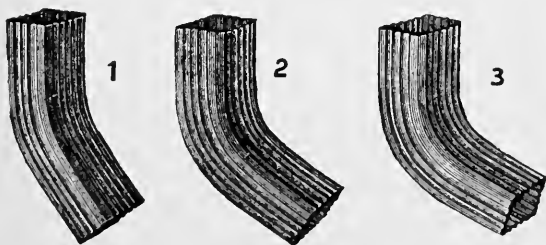
2 inch Round Shoes	.....	.30
3 " " "	.....	.36
4 " " "	.....	.48
5 " " "	.....	.60
6 " " "	.....	.72



SQUARE GALVANIZED CONDUCTOR.

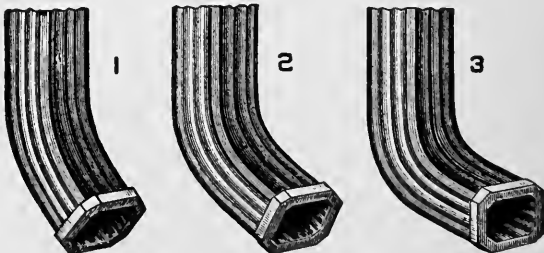
2 1/4 x 1 3/4 inches, per foot	.....	.14
3 1/4 x 2 3/8 " " "	.....	.16
4 1/4 x 2 3/4 " " "	.....	.21
5 x 3 3/4 " " "	.....	.26

SQUARE ELBOWS.



2 inch Square Elbows	.....	.30
3 " " "	.....	.36
4 " " "	.....	.48
5 " " "	.....	.60

SQUARE SHOES.



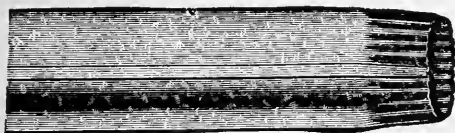
2 inch Square Shoes	.....	.40
3 " " "	.....	.48
4 " " "	.....	.60
5 " " "	.....	.72

Right and Left Elbows, Angle Equal to No. 3, Price Same as Square Elbows.



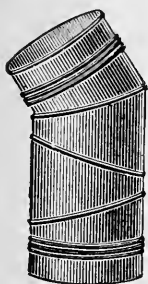
# GALVANIZED ROUND PIPE, PLAIN AND CORRUGATED.

MADE IN TEN-FOOT LENGTHS, WITHOUT CROSS SEAMS.



No. 28. Iron. Sizes.	2	3	4	5	6
Per foot.	.13	.15	.20	.25	.30

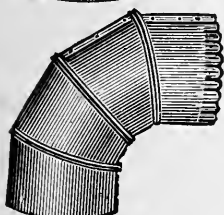
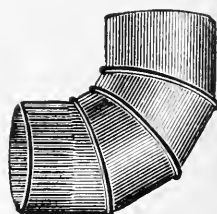
Same list for Plain and Corrugated. Suitable as conductor, air, ventilation pipes, etc.



## PATENT ADJUSTABLE ELBOWS.

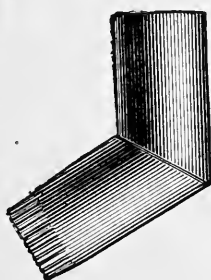
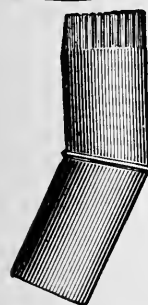
PER DOZEN.

Sizes,	1½	2	2½	3	3½	4	4½	5	5½	6
Tin, \$	1.80	1.80	2.40	2.40	3.60	3.60	4.80	4.80	6.60	6.60
Galv.,	2.40	2.40	3.00	3.60	4.20	4.80	5.40	6.60	7.80	8.40
Black,	--	--	--	--	--	3.00	3.00	3.50	4.50	4.50



## FOUR-PIECE STIFF ELBOWS.

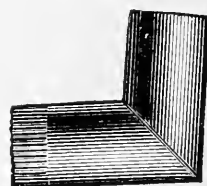
Sizes	4	4½	5	5½	6	7	8
Charcoal per doz.,	\$1.65	1.85	2.00	2.10	2.30	2.75	4.50
Russia, " "	3.00	3.75	4.50	5.15	5.55	7.00	--
Galvanized " "	3.50	3.75	4.00	5.50	6.00	7.00	9.00



## LEADER PIPE BENDS.

GALVANIZED IRON.

Size	No. 1.	No. 2.	No. 3.
2-In., per doz.,	\$1.10	1.10	1.20
3 " "	1.30	1.30	1.30
4 " "	1.60	1.60	1.60
5 " "	2.00	2.00	2.00
6 " "	2.50	2.50	2.50



No. 3.

No. 1.

No. 2.

## COPPER LEADER PIPE.

Plain Round. Round Corrugated. Square Corrugated.

2-Inch	.25	.28	.30
3 " "	.34	.35	.37
4 " "	.40	.41	.42
5 " "	.45	.47	.50
6 " "	.50	.58	--

## —COPPER ELBOWS—

Round Cor. Square Cor.

## —COPPER SHOES—

Round Cor. Square Cor.

2 inch	.40	.45	.45	.55
3 " "	.50	.55	.55	.65
4 " "	.60	.65	.65	.75
5 " "	.75	.80	.80	.90
6 " "	.90	--	.95	--

Right and Left Elbows. Price same as Square Elbows.

## CAST-IRON BOOTS AND SEWER CONNECTIONS.

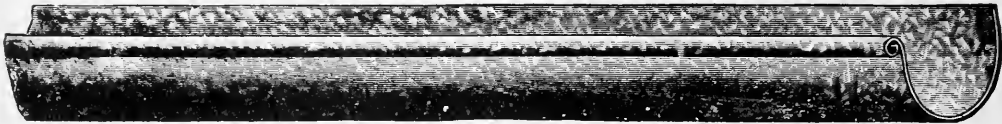
WITH OR WITHOUT LUGS.

3 Inch, each	\$3.00
4 " "	4.00
5 " "	5.00
6 " "	6.00

4½ feet long.



GALVANIZED IRON EAVE TROUGH.

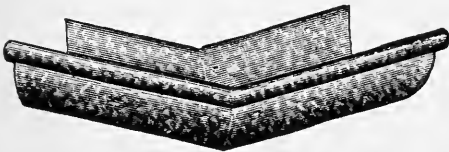


Made with both edges beaded when required ; also extra length backs.

Size.....	3	4	5	6	7	8
Per foot .....	.13	.16	.19	.23	.27	.30

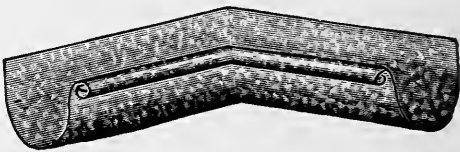
Size taken inside of bead. Add 3 cts. to list price for double beaded.

GALVANIZED STEEL LAP-JOINT MITRES.



OUTER CORNER MITRE.

Mitres ready for use kept in stock Lap Joint.



INNER CORNER MITRE.

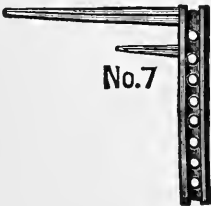
Size.....	3	4	5	6	7	8
Per dozen.....	3.00	3.25	3.50	4.00	5.00	6.50



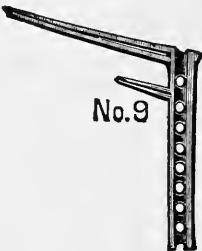
MALLEABLE IRON ADJUSTABLE EAVE TROUGH HANGERS.

Size.....	3	4	5	6	7	8
Galvanized, per 100.....	2.60	2.75	4.75	5.50	6.00	7.25
Black, per 100.....	2.00	2.50	3.50	4.00	5.00	5.50

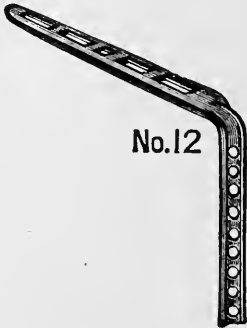
SHANKS.



No.7



No.9



No.12

Size.....	3	4	5	6	7	8
Galvanized, per 100.....	2.60	3.00	4.00	4.25	4.75	5.25
Black, " 100.....	2.00	2.25	3.00	3.50	3.75	4.00

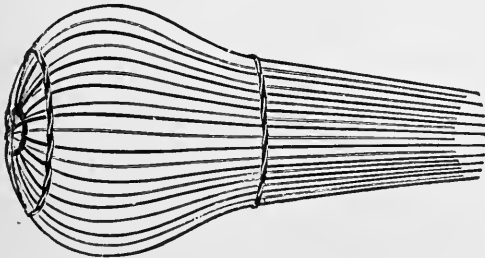


WROUGHT IRON GUTTER BRACES.

Size..... $\frac{1}{8} \times 1$ }	Galv., .23 each ; Black, .17 each.			Size..... $\frac{3}{16} \times 1$ }	Galv., .26 each ; Black, .20 each.		
Length .....15 }				Length .....18 }			

CONDUCTOR STRAINERS.

LEADER HOOKS.



Size.....	2	3	4	5
Galvanized, per doz..	2.50	3.00	3.50	5.00
Size.....	6	8	10	12
Galvanized, per doz..	6.00	10.50	15.00	18.00



Size, Inches.....	2	2½	3	3½	4	5	6
Each, Galvanized...	.05	.05	.06	.07	.08	.12	.15
" Black.....	.04	.04	.05	.05	.06	.09	.11
Size, Inches.....	7	8	9	10	11	12	
Each, Galvanized...	.19	.24	.30	.39	.48	.60	
" Black.....	.16	.18	.23	.30	.37	.45	

# CAST IRON FITTINGS.

## LIST OF STANDARD SIZES.—(ADOPTED JUNE 24, 1897.)

NOTE.—Sizes not mentioned in the following list are to be charged at five (5%) per cent. gross discount higher than those found in the "Standard Sizes."

Elbows, not reducing,  $\frac{1}{4}$  to 12-inch inclusive.  
 45° Elbows,  $\frac{3}{4}$  to 12-inch inclusive.  
 Right and Left Elbows,  $\frac{1}{4}$  to 3-inch inclusive.  
 Tees, not reducing,  $\frac{1}{4}$  to 12-inch inclusive.  
 Crosses, not reducing,  $\frac{3}{8}$  to 12-inch inclusive.  
 Offsets, to offset 4, 6 and 8 inches,  $\frac{3}{4}$  to 6-inch inclusive.  
 Ys, not reducing,  $\frac{1}{2}$  to 10-inch inclusive.

Return Bends, Close,  $\frac{1}{2}$  to 3-inch inclusive.  
 Return Bends, Open,  $\frac{1}{2}$  to 3-inch inclusive.  
 Flange Unions,  $\frac{1}{2}$  to 12-inch inclusive.  
 Caps, 2 to 12-inch inclusive.  
 Locknuts, 2 to 12-inch inclusive.  
 Plugs,  $\frac{1}{4}$  to 12-inch inclusive.

### ELBOWS.—REDUCING SIZES.

$\frac{1}{2}$ x $\frac{3}{8}$	$1\frac{1}{4}$ x 1	2 x $1\frac{1}{2}$	3 x $2\frac{1}{2}$	4 x 3	6 x 5
$\frac{3}{4}$ x $\frac{1}{2}$	$1\frac{1}{4}$ x $\frac{3}{4}$	2 x $1\frac{1}{4}$	3 x 2	4 x $2\frac{1}{2}$	6 x 4
1 x $\frac{3}{4}$	$1\frac{1}{4}$ x $\frac{1}{2}$	2 x 1			
1 x $\frac{1}{2}$	$1\frac{1}{2}$ x $1\frac{1}{4}$	$2\frac{1}{2}$ x 2	$3\frac{1}{2}$ x 3	$4\frac{1}{2}$ x 4	8 x 6
	$1\frac{1}{2}$ x 1	$2\frac{1}{2}$ x $1\frac{1}{2}$	4 x $3\frac{1}{2}$	5 x 4	
	$1\frac{1}{2}$ x $\frac{3}{4}$				

### REDUCING COUPLINGS.

$2\frac{1}{2}$ x 2	$3\frac{1}{2}$ x $2\frac{1}{2}$	$4\frac{1}{2}$ x 4	6 x 4	10 x 8
$2\frac{1}{2}$ x $1\frac{1}{2}$			6 x 3	
3 x $2\frac{1}{2}$	4 x $3\frac{1}{2}$	5 x 4		
3 x 2	4 x 3	5 x 3	7 x 6	12 x 10
$3\frac{1}{2}$ x 3	4 x $2\frac{1}{2}$	6 x 5	8 x 6	
	4 x 2			

### TEES.—REDUCING SIZES.

NOTE.—Tees which reduce on the outlet, thus:

$\frac{1}{4}$   
 $\frac{2}{2}$  |  $\frac{2}{2}$   
 are read,  $2 \times 1\frac{1}{4}$ .

Tees reducing on run, thus:

$\frac{1}{4}$   
 $\frac{2}{2}$  |  $\frac{1}{2}$   
 are read,  $2 \times 1\frac{1}{2} \times 1\frac{1}{4}$ .

Tees with both ends of run the same size, with the outlet larger, thus:

$\frac{2}{1}$  |  $\frac{1}{1}$   
 are known as Bull Head, and are read  $1 \times 2$ .

Reducing on Outlet.	Reducing on Outlet.	Bull Head.	Reducing on Run.
$\frac{1}{2}$ x $\frac{3}{8}$	4 x 2	$\frac{3}{8}$ x $\frac{1}{2}$	$\frac{1}{2}$ x $\frac{3}{8}$ x $\frac{1}{2}$
$\frac{3}{4}$ x $\frac{1}{2}$	4 x $1\frac{1}{2}$		$\frac{1}{2}$ x $\frac{3}{8}$ x $\frac{3}{8}$
$\frac{3}{4}$ x $\frac{3}{8}$	4 x $1\frac{1}{4}$	$\frac{1}{2}$ x 1	$\frac{3}{4}$ x $\frac{1}{2}$ x 1
1 x $\frac{3}{4}$	4 x 1	$\frac{1}{2}$ x $\frac{3}{4}$	$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{3}{4}$
1 x $\frac{1}{2}$	4 x $\frac{3}{4}$		$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{1}{2}$
1 x $\frac{3}{8}$	$4\frac{1}{2}$ x 4	$\frac{3}{4}$ x 2	$\frac{3}{4}$ x $\frac{3}{8}$ x $\frac{3}{4}$
$1\frac{1}{4}$ x 1	$4\frac{1}{2}$ x $3\frac{1}{2}$	$\frac{3}{4}$ x $1\frac{1}{2}$	$\frac{3}{4}$ x $\frac{3}{8}$ x $\frac{3}{8}$
$1\frac{1}{4}$ x $\frac{3}{4}$	$4\frac{1}{2}$ x 3	$\frac{3}{4}$ x $1\frac{1}{4}$	
$1\frac{1}{4}$ x $\frac{1}{2}$	$4\frac{1}{2}$ x $2\frac{1}{2}$	$\frac{3}{4}$ x 1	
	$4\frac{1}{2}$ x 2		
$1\frac{1}{2}$ x $1\frac{1}{4}$	5 x 4		1 x $\frac{3}{4}$ x 2
$1\frac{1}{2}$ x 1	5 x $3\frac{1}{2}$	1 x 2	1 x $\frac{3}{4}$ x $1\frac{1}{2}$
$1\frac{1}{2}$ x $\frac{3}{4}$	5 x 3	1 x $1\frac{1}{2}$	1 x $\frac{3}{4}$ x $1\frac{1}{4}$
$1\frac{1}{2}$ x $\frac{1}{2}$	5 x $2\frac{1}{2}$	1 x $1\frac{1}{4}$	1 x $\frac{3}{4}$ x $\frac{3}{4}$
$1\frac{1}{2}$ x $\frac{3}{8}$	5 x 2		1 x $\frac{3}{4}$ x $\frac{1}{2}$
2 x $1\frac{1}{2}$	5 x $1\frac{1}{2}$	$1\frac{1}{4}$ x 2	1 x $\frac{1}{2}$ x 1
2 x $1\frac{1}{4}$	5 x $1\frac{1}{4}$	$1\frac{1}{4}$ x $1\frac{1}{2}$	1 x $\frac{1}{2}$ x $\frac{3}{4}$
2 x 1	6 x 5		1 x $\frac{1}{2}$ x $1\frac{1}{2}$
2 x $\frac{3}{4}$	6 x 4		1 x $\frac{3}{8}$ x 1
2 x $\frac{1}{2}$	6 x $3\frac{1}{2}$	$1\frac{1}{2}$ x $2\frac{1}{2}$	
	6 x 3	$1\frac{1}{2}$ x 2	$1\frac{1}{4}$ x 1 x 2
$2\frac{1}{2}$ x 2	6 x $2\frac{1}{2}$		$1\frac{1}{4}$ x 1 x $1\frac{1}{2}$
$2\frac{1}{2}$ x $1\frac{1}{2}$	6 x 2		$1\frac{1}{4}$ x 1 x $1\frac{1}{4}$
$2\frac{1}{2}$ x $1\frac{1}{4}$		2 x 3	$1\frac{1}{4}$ x 1 x 1
$2\frac{1}{2}$ x 1	7 x 6	2 x $2\frac{1}{2}$	$1\frac{1}{4}$ x 1 x $\frac{3}{4}$
$2\frac{1}{2}$ x $\frac{3}{4}$	7 x 5		$1\frac{1}{4}$ x 1 x $\frac{1}{2}$
	7 x 4		$1\frac{1}{4}$ x $\frac{3}{4}$ x 2
3 x $2\frac{1}{2}$		$2\frac{1}{2}$ x 4	$1\frac{1}{4}$ x $\frac{3}{4}$ x $1\frac{1}{2}$
3 x 2	8 x 6	$2\frac{1}{2}$ x 3	$1\frac{1}{4}$ x $\frac{3}{4}$ x $1\frac{1}{4}$
3 x $1\frac{1}{2}$	8 x 5		$1\frac{1}{4}$ x $\frac{3}{4}$ x 1
3 x $1\frac{1}{4}$	8 x 4		$1\frac{1}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$
3 x 1	8 x $3\frac{1}{2}$	3 x 4	$1\frac{1}{4}$ x $\frac{1}{2}$ x $1\frac{1}{2}$
3 x $\frac{3}{4}$	8 x 3	3 x $3\frac{1}{2}$	$1\frac{1}{4}$ x $\frac{1}{2}$ x $1\frac{1}{4}$
	8 x $2\frac{1}{2}$		
$3\frac{1}{2}$ x 3	8 x 2		
$3\frac{1}{2}$ x $2\frac{1}{2}$		$3\frac{1}{2}$ x 4	$1\frac{1}{2}$ x $1\frac{1}{4}$ x 2
$3\frac{1}{2}$ x 2	10 x 8	4 x 6	$1\frac{1}{2}$ x 1 x 2
$3\frac{1}{2}$ x $1\frac{1}{2}$	10 x 6	4 x 5	$1\frac{1}{2}$ x $\frac{3}{4}$ x 2
$3\frac{1}{2}$ x $1\frac{1}{4}$	10 x 5		$1\frac{1}{2}$ x $1\frac{1}{4}$ x $1\frac{1}{2}$
$3\frac{1}{2}$ x 1	10 x 4		$1\frac{1}{2}$ x $1\frac{1}{4}$ x $1\frac{1}{4}$
		5 x 6	$1\frac{1}{2}$ x $1\frac{1}{4}$ x 1
4 x $3\frac{1}{2}$	12 x 10		$1\frac{1}{2}$ x $1\frac{1}{4}$ x $\frac{3}{4}$
4 x 3	12 x 8	6 x 8	$1\frac{1}{2}$ x $1\frac{1}{4}$ x $\frac{1}{2}$
4 x $2\frac{1}{2}$	12 x 6	6 x 7	$1\frac{1}{2}$ x 1 x $1\frac{1}{2}$

## CAST IRON FITTINGS.

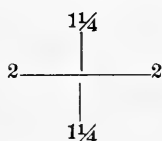
LIST OF STANDARD SIZES.—(ADOPTED JUNE 24, 1897.)

## TEES.—REDUCING SIZES.

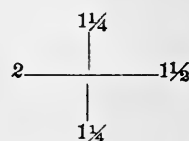
Reducing on Run.	Reducing on Run.	Reducing on Run.	Reducing on Run.	Reducing on Run.	Reducing on Run.
$1\frac{1}{2} \times 1 \times 1$	$2 \times 1 \times 1\frac{1}{4}$	$3 \times 2\frac{1}{2} \times 2\frac{1}{2}$	$3\frac{1}{2} \times 2 \times 3\frac{1}{2}$	$4 \times 2 \times 2\frac{1}{2}$	$6 \times 4 \times 6$
$1\frac{1}{2} \times 1 \times \frac{3}{4}$	$2 \times 1 \times 1$	$3 \times 2\frac{1}{2} \times 2$	$3\frac{1}{2} \times 1\frac{1}{2} \times 3\frac{1}{2}$	$4 \times 2 \times 2$	$6 \times 3 \times 6$
$1\frac{1}{2} \times 1 \times \frac{1}{2}$	$2 \times 1 \times \frac{3}{4}$	$3 \times 2\frac{1}{2} \times 1\frac{1}{2}$	$3\frac{1}{2} \times 1\frac{1}{4} \times 3\frac{1}{2}$	$4 \times 2 \times 1\frac{1}{2}$	$6 \times 2\frac{1}{2} \times 6$
$1\frac{1}{2} \times \frac{3}{4} \times 1\frac{1}{2}$	$2 \times \frac{3}{4} \times 2$	$3 \times 2\frac{1}{2} \times 1\frac{1}{4}$	$3\frac{1}{2} \times 1 \times 3\frac{1}{2}$	$4 \times 1\frac{1}{2} \times 4$	
$1\frac{1}{2} \times \frac{3}{4} \times 1\frac{1}{4}$	$2 \times \frac{3}{4} \times 1\frac{1}{2}$	$3 \times 2\frac{1}{2} \times 1$		$4 \times 1\frac{1}{4} \times 4$	$7 \times 6 \times 7$
$1\frac{1}{2} \times \frac{3}{4} \times 1$	$2 \times \frac{1}{2} \times 2$	$3 \times 2 \times 3$	$4 \times 3\frac{1}{2} \times 3\frac{1}{2}$	$4 \times 1 \times 4$	$7 \times 6 \times 6$
$1\frac{1}{2} \times \frac{3}{4} \times \frac{3}{4}$		$3 \times 2 \times 2\frac{1}{2}$	$4 \times 3\frac{1}{2} \times 3$		$7 \times 6 \times 5$
$1\frac{1}{2} \times \frac{1}{2} \times 1\frac{1}{2}$	$2\frac{1}{2} \times 2 \times 3$	$3 \times 2 \times 2$	$4 \times 3\frac{1}{2} \times 2\frac{1}{2}$	$5 \times 4 \times 5$	$7 \times 5 \times 5$
$1\frac{1}{2} \times \frac{1}{2} \times 1\frac{1}{4}$	$2\frac{1}{2} \times 2 \times 2\frac{1}{2}$	$3 \times 2 \times 1\frac{1}{2}$	$4 \times 3 \times 4$	$5 \times 4 \times 4$	
	$2\frac{1}{2} \times 2 \times 2$	$3 \times 2 \times 1\frac{1}{4}$	$4 \times 3 \times 3\frac{1}{2}$	$5 \times 4 \times 3$	$8 \times 7 \times 6$
$2 \times 1\frac{1}{2} \times 2\frac{1}{2}$	$2\frac{1}{2} \times 2 \times 1\frac{1}{2}$	$3 \times 2 \times 1$	$4 \times 3 \times 3$	$5 \times 4 \times 2\frac{1}{2}$	$8 \times 6 \times 8$
$2 \times 1\frac{1}{2} \times 2$	$2\frac{1}{2} \times 2 \times 1\frac{1}{4}$	$3 \times 1\frac{1}{2} \times 3$	$4 \times 3 \times 2\frac{1}{2}$	$5 \times 4 \times 2$	$8 \times 6 \times 7$
$2 \times 1\frac{1}{2} \times 1\frac{1}{2}$	$2\frac{1}{2} \times 2 \times 1$	$3 \times 1\frac{1}{2} \times 2\frac{1}{2}$	$4 \times 3 \times 2$	$5 \times 3 \times 5$	$8 \times 6 \times 6$
$2 \times 1\frac{1}{2} \times 1\frac{1}{4}$	$2\frac{1}{2} \times 1\frac{1}{2} \times 2\frac{1}{2}$	$3 \times 1\frac{1}{2} \times 2$	$4 \times 3 \times 1\frac{1}{2}$	$5 \times 3 \times 4$	$8 \times 5 \times 8$
$2 \times 1\frac{1}{2} \times 1$	$2\frac{1}{2} \times 1\frac{1}{2} \times 2$	$3 \times 1\frac{1}{4} \times 3$	$4 \times 3 \times 1\frac{1}{4}$	$5 \times 3 \times 3$	$8 \times 5 \times 5$
$2 \times 1\frac{1}{2} \times \frac{3}{4}$	$2\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$	$3 \times 1 \times 3$	$4 \times 3 \times 1$	$5 \times 3 \times 2\frac{1}{2}$	$8 \times 4 \times 8$
$2 \times 1\frac{1}{2} \times \frac{1}{2}$	$2\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{4}$		$4 \times 3 \times \frac{3}{4}$	$5 \times 3 \times 2$	
$2 \times 1\frac{1}{4} \times 2$	$2\frac{1}{2} \times 1\frac{1}{2} \times 1$	$3\frac{1}{2} \times 3 \times 3$	$4 \times 2\frac{1}{2} \times 4$	$5 \times 2\frac{1}{2} \times 5$	$10 \times 8 \times 8$
$2 \times 1\frac{1}{4} \times 1\frac{1}{2}$	$2\frac{1}{2} \times 1\frac{1}{4} \times 2\frac{1}{2}$	$3\frac{1}{2} \times 3 \times 2\frac{1}{2}$	$4 \times 2\frac{1}{2} \times 3$	$5 \times 2\frac{1}{2} \times 4$	
$2 \times 1\frac{1}{4} \times 1\frac{1}{4}$	$2\frac{1}{2} \times 1\frac{1}{4} \times 2$	$3\frac{1}{2} \times 3 \times 2$	$4 \times 2\frac{1}{2} \times 2\frac{1}{2}$	$5 \times 2\frac{1}{2} \times 3$	$12 \times 8 \times 10$
$2 \times 1\frac{1}{4} \times 1$	$2\frac{1}{2} \times 1 \times 2\frac{1}{2}$	$3\frac{1}{2} \times 3 \times 1\frac{1}{2}$	$4 \times 2\frac{1}{2} \times 2$	$5 \times 2 \times 5$	$12 \times 8 \times 8$
$2 \times 1\frac{1}{4} \times \frac{3}{4}$	$2\frac{1}{2} \times \frac{3}{4} \times 2\frac{1}{2}$	$3\frac{1}{2} \times 2\frac{1}{2} \times 3$	$4 \times 2\frac{1}{2} \times 1\frac{1}{2}$		
$2 \times 1 \times 2$		$3\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2}$	$4 \times 2 \times 4$	$6 \times 5 \times 6$	
$2 \times 1 \times 1\frac{1}{2}$	$3 \times 2\frac{1}{2} \times 3$	$3\frac{1}{2} \times 2\frac{1}{2} \times 2$	$4 \times 2 \times 3$	$6 \times 5 \times 5$	

## CROSSES.—REDUCING SIZES.

NOTE.—When the opposite openings of a Cross are of the same size, thus :

It is called a  $2 \times 1\frac{1}{4}$  Cross.

NOTE.—When a Cross reduces on the run, thus :

It is called a  $2 \times 1\frac{1}{2} \times 1\frac{1}{4}$  Cross.

Reducing on Outlets.	Reducing on Outlets.	Reducing on Outlets.	Reducing on Outlets.	Reducing on Outlets.	Reducing on Outlets.	Reducing on Outlets.
$\frac{1}{2} \times \frac{3}{8}$	$1\frac{1}{4} \times \frac{3}{4}$	$2 \times 1$	$3 \times 2$	$4 \times 3\frac{1}{2}$	$6 \times 5$	$8 \times 7$
$\frac{1}{2} \times \frac{1}{4}$	$1\frac{1}{4} \times \frac{1}{2}$	$2 \times \frac{3}{4}$	$3 \times 1\frac{1}{2}$	$4 \times 3$	$6 \times 4$	$8 \times 6$
			$3 \times 1\frac{1}{4}$	$4 \times 2\frac{1}{2}$	$6 \times 3\frac{1}{2}$	
$\frac{3}{4} \times \frac{3}{8}$	$1\frac{1}{2} \times 1\frac{1}{4}$	$2\frac{1}{2} \times 2$	$3 \times 1$	$4 \times 2$	$6 \times 3$	$10 \times 8$
$\frac{3}{4} \times \frac{1}{2}$	$1\frac{1}{2} \times 1$	$2\frac{1}{2} \times 1\frac{1}{2}$	$3 \times \frac{3}{4}$		$6 \times 2\frac{1}{2}$	$10 \times 7$
	$1\frac{1}{2} \times \frac{3}{4}$	$2\frac{1}{2} \times 1\frac{1}{4}$		$5 \times 4$	$6 \times 2$	
$1 \times \frac{3}{4}$	$1\frac{1}{2} \times \frac{1}{2}$	$2\frac{1}{2} \times 1$	$3\frac{1}{2} \times 3$	$5 \times 3$		$12 \times 10$
$1 \times \frac{1}{2}$		$2\frac{1}{2} \times \frac{3}{4}$	$3\frac{1}{2} \times 2\frac{1}{2}$	$5 \times 2\frac{1}{2}$	$7 \times 6$	$12 \times 8$
$1\frac{1}{4} \times 1$	$2 \times 1\frac{1}{2}$	$3 \times 2\frac{1}{2}$	$3\frac{1}{2} \times 2$	$5 \times 2$	$7 \times 5$	
	$2 \times 1\frac{1}{4}$					

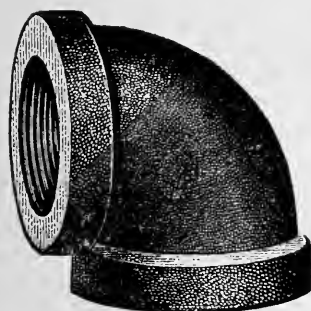
## BUSHINGS.

NOTE.—Bushings reducing but one size,  $2\frac{1}{2}$  and smaller, are Malleable, and will be found among Malleable Fittings.

$\frac{1}{2} \times \frac{1}{4}$	$1\frac{1}{2} \times \frac{3}{4}$	$3 \times 2$	$4 \times 2\frac{1}{2}$	$5 \times 3$	$7 \times 4\frac{1}{2}$	$9 \times 7$
$\frac{3}{4} \times \frac{3}{8}$	$1\frac{1}{2} \times \frac{1}{2}$	$3 \times 1\frac{1}{2}$	$4 \times 2$	$5 \times 2\frac{1}{2}$	$7 \times 4$	$9 \times 6$
$\frac{3}{4} \times \frac{1}{4}$		$3 \times 1\frac{1}{4}$	$4 \times 1\frac{1}{2}$	$5 \times 2$	$7 \times 3\frac{1}{2}$	
	$2 \times 1\frac{1}{4}$	$3 \times 1$	$4 \times 1\frac{1}{4}$		$7 \times 3$	$10 \times 8$
$1 \times \frac{1}{2}$	$2 \times 1$		$4 \times 1$	$6 \times 5$	$7 \times 2\frac{1}{2}$	$10 \times 6$
$1 \times \frac{3}{8}$	$2 \times \frac{3}{4}$	$3\frac{1}{2} \times 3$		$6 \times 4\frac{1}{2}$	$7 \times 2$	
$1 \times \frac{1}{4}$	$2 \times \frac{1}{2}$	$3\frac{1}{2} \times 2\frac{1}{2}$	$4\frac{1}{2} \times 4$	$6 \times 4$		$12 \times 10$
		$3\frac{1}{2} \times 2$	$4\frac{1}{2} \times 3\frac{1}{2}$	$6 \times 3\frac{1}{2}$	$8 \times 7$	$12 \times 8$
$1\frac{1}{4} \times \frac{3}{4}$	$2\frac{1}{2} \times 1\frac{1}{2}$	$3\frac{1}{2} \times 1\frac{1}{2}$	$4\frac{1}{2} \times 3$	$6 \times 3$	$8 \times 6$	$12 \times 6$
$1\frac{1}{4} \times \frac{1}{2}$	$2\frac{1}{2} \times 1\frac{1}{4}$	$3\frac{1}{2} \times 1\frac{1}{4}$	$4\frac{1}{2} \times 2\frac{1}{2}$	$6 \times 2\frac{1}{2}$	$8 \times 5$	
$1\frac{1}{4} \times \frac{3}{8}$	$2\frac{1}{2} \times 1$	$3\frac{1}{2} \times 1$		$6 \times 2$	$8 \times 4$	
	$2\frac{1}{2} \times \frac{3}{4}$		$5 \times 4\frac{1}{2}$		$8 \times 3$	
$1\frac{1}{2} \times 1$	$3 \times 2\frac{1}{2}$	$4 \times 3\frac{1}{2}$	$5 \times 4$	$7 \times 6$		
		$4 \times 3$	$5 \times 3\frac{1}{2}$	$7 \times 5$	$9 \times 8$	

## CAST IRON FITTINGS.

### ELBOWS—STRAIGHT SIZES.



ELBOW.

Size.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Each.....	.05	.05	.06	.08	.10	.16
Size.....	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3		
Each.....	.20	.28	.50	.75		
Size.....	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7
Each.....	1.05	1.20	1.75	2.00	2.75	4.70
Size.....	8	9	10	12		
Each.....	6.75	9.00	13.50	20.00		

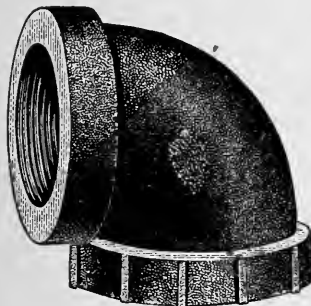
### ELBOWS—REDUCING SIZES.



REDUCING ELBOW.

Size.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Each.....	.06	.07	.09	.12	.18	.23	.32
Size.....	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6
Each.....	.60	.85	1.20	1.40	2.00	2.30	3.15
Size.....	7	8	9	10	12		
Each.....	5.40	7.75	10.50	15.50	23.00		

### ELBOWS—RIGHT AND LEFT, AND LEFT HAND.



R. AND L. ELBOW.

Size.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Each.....	.06	.06	.07	.09	.12	.18
Size.....	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3		
Each.....	.23	.32	.60	.85		

### ELBOWS—45°

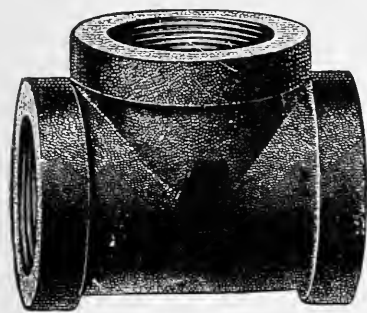


45° ELBOW.

Size.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Each.....	.06	.06	.07	.10	.12	.19
Size.....	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3		
Each.....	.24	.34	.60	.90		
Size.....	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7
Each.....	1.25	1.45	2.20	2.50	3.45	5.90
Size.....	8	9	10	12		
Each.....	8.50	11.25	17.00	25.00		

Lists for Galvanized Cast Iron Fittings, page 24.  
Schedule of Reducing Sizes, pages 17 and 18.

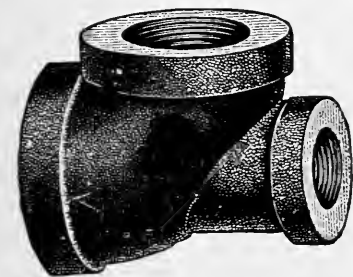
CAST IRON FITTINGS.—Continued.



TEE.

TEES—STRAIGHT SIZES.

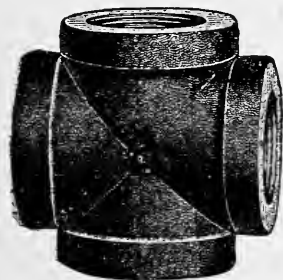
Size.....	¼	⅜	½	¾	1	1¼	1½
Each.....	.08	.08	.09	.12	.15	.23	.29
Size.....	2	2½	3	3½	4	4½	5
Each.....	.41	.73	1.10	1.50	1.75	2.55	3.00
Size.....	6	7	8	9	10	12	
Each.....	4.00	6.80	9.75	13.00	19.50	29.00	



REDUCING TEE.

TEES—REDUCING SIZES.

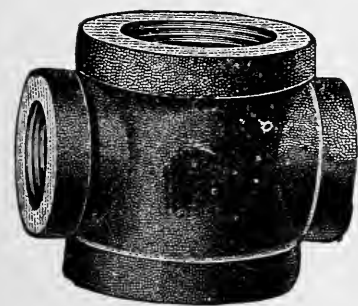
Size.....	⅜	½	¾	1	1¼	1½	2
Each.....	.09	.10	.14	.17	.27	.33	.47
Size.....	2½	3	3½	4	4½	5	6
Each.....	.83	1.25	1.75	2.00	2.95	3.50	4.60
Size.....	7	8	9	10	12		
Each.....	7.80	11.25	15.00	22.50	33.50		



CROSS.

CROSSES—STRAIGHT SIZES.

Size.....	⅜	½	¾	1	1¼	1½	2
Each.....	.15	.16	.22	.27	.42	.53	.75
Size.....	2½	3	3½	4	4½	5	6
Each.....	1.30	2.00	2.70	3.15	4.60	5.50	7.25
Size.....	7	8	9	10	12		
Each.....	12.25	17.50	23.50	35.00	52.50		



REDUCING CROSS.

CROSSES—REDUCING SIZES.

Size.....	½	¾	1	1¼	1½	2	
Each.....	.18	.25	.30	.46	.60	.83	
Size.....	2½	3	3½	4	4½	5	
Each.....	1.45	2.20	3.00	3.50	5.10	6.00	
Size.....	6	7	8	9	10	12	
Each.....	8.00	13.50	19.25	26.00	38.50	58.00	



REDUCING COUPLING.

REDUCING COUPLINGS.

Size.....	1½	2	2½	3	3½	4	4½
Each.....	---	.43	.60	.80	1.00	1.35	1.85
Size.....	5	6	7	8	9	10	12
Each.....	2.00	2.70	5.35	6.75	8.35	10.00	15.00

Lists for Galvanized Cast Iron Fittings, page 24.  
Schedule of Reducing Sizes, pages 17 and 18.

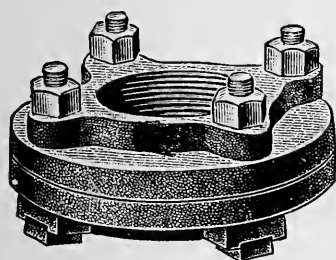
# CAST IRON FITTINGS.—Continued.



OFFSET.

## OFFSETS.

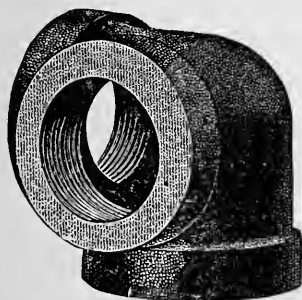
Size.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
To Offset 4 in....	.45	.70	1.00	1.20	1.80	3.00
Size.....	3	$3\frac{1}{2}$	4	5	6	
To Offset 4 in....	4.00	5.00	6.00	8.00	10.00	
Size.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
To Offset 6 in....	.67	1.05	1.50	1.80	2.70	4.50
Size.....	3	$3\frac{1}{2}$	4	5	6	
To Offset 6 in....	6.00	7.50	9.00	12.00	15.00	
Size.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
To Offset 8 in....	.90	1.40	2.00	2.40	3.60	6.00
Size.....	3	$3\frac{1}{2}$	4	5	6	
To Offset 8 in....	8.00	10.00	12.00	16.00	20.00	



FLANGE UNION.

## FLANGE UNIONS.

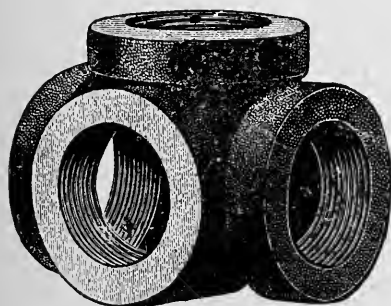
Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Diam. of Flanges..	$2\frac{11}{16}$	$3\frac{1}{8}$	$3\frac{1}{2}$	$3\frac{13}{16}$	$4\frac{3}{8}$	$5\frac{1}{8}$	$6\frac{1}{16}$	$6\frac{3}{4}$	$7\frac{1}{4}$
Number of Bolts...	3	3	3	4	4	4	4	4	4
Each.....	.40	.46	.52	.64	.78	1.00	1.25	1.50	1.80
Size.....	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Diam. of Flanges..	$7\frac{13}{16}$	$8\frac{1}{4}$	$9\frac{1}{16}$	10	$11\frac{1}{16}$	$12\frac{1}{8}$	$13\frac{1}{4}$	$15\frac{1}{16}$	$17\frac{1}{4}$
Number of Bolts...	4	5	5	6	7	8	9	10	12
Each.....	2.10	2.70	3.15	3.95	5.50	7.00	10.00	11.50	16.00



SIDE OUTLET ELBOW.

## SIDE OUTLET ELBOWS.

Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Each.....	.18	.24	.30	.48	.60	.84	1.50	2.25	3.15
Size.....	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Each.....	3.60	5.25	6.00	8.25					



SIDE OUTLET TEE.

## SIDE OUTLET TEES.

Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Each.....	.27	.36	.45	.70	.90	1.25	2.25
Size.....	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	
Each.....	3.25	4.50	5.25	7.65	9.00	12.00	

Lists for Galvanized Cast Iron Fittings, page 24.  
Schedule of Reducing Sizes, pages 17 and 18.

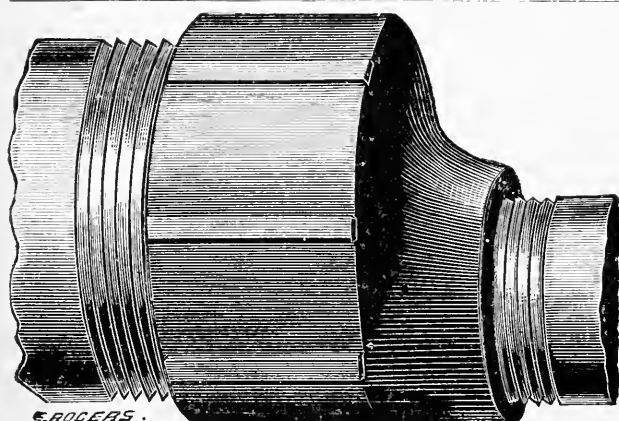


## CAST IRON FITTINGS.—Continued.

OFFSET  
REDUCING COUPLING.

## OFFSET REDUCING COUPLINGS.

Size.....	2½x1¼	2½x1½	2½x2	3x2	3x2½	
Each.....	1.50	1.50	1.50	2.40	2.40	
Size.....	3½x3	3½x2½	4x3½	4x3	5x4	6x4
Each.....	3.00	3.00	4.00	4.00	6.00	8.00



## ECCENTRIC REDUCERS.

Size.....	1¼	1½	2	2½	3
Each....	25	.36	50	.75	1.20
Size.....	3½	4	5	6	8
Each....	1.50	2.00	3.00	4.00	10.00

## SIZE INCHES.

1 x ¾	2½x ¾	3½x3	4x1½	5x1
1¼x ¾	2½x2	3½x2½	4x1¼	6x5
1¼x1	2½x1½	3½x2	4x1	6x4
1½x ¾	2½x1¼	3½x1½	5x3½	(x3½)
1½x1¼	2½x1	3½x1¼	5x4	6x3
1½x1	3 x2½	3½x1	5x3	6x2½
2 x ¾	3 x2	4 x3½	5x2½	6x2
2 x1½	3 x1½	4 x3	5x2	6x1½
2 x1¼	3 x1¼	4 x2½	5x1½	6x1¼
2 x1	3 x1	4 x2	5x1¼	6x1



PLUG.

## PLUGS—SQUARE HEAD AND SOLID.

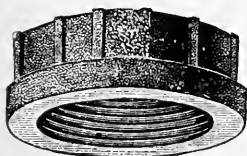
Size.....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Sq. Hd., ea.	.02	.02	.02	.02	.03	.04	.05	.07	.10	.18	.25
Solid, ".....	.04	.04	.04	.04	.06	.08	.09	.11	.15	.27	.38
Size.....	3 1/2	4	4 1/2	5	6	7	8	9	10	12	
Sq. Hd., ea.	.38	.42	.65	.88	1.20	1.85	2.75	3.25	3.75	5.00	
Solid, ".....	.57	.63	1.00	1.35	1.80	2.80	4.15	5.00	5.75	7.50	



PLUG. (Socket.)

## PLUGS—SOCKET AND LEFT HAND.

Size.....	1/2	3/4	1	1¼	1½	2
Socket Plugs.....	.04	.06	.08	.09	.11	.15
Left Hand Plugs.....	.06	.08	.09	.11	.15	.15



CAP.

## CAPS.

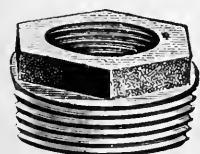
Size...	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Each..	.26	.40	.54	.75	.87	1.05	1.20	1.55	2.50	2.85	4.75	5.50	7.00



LOCKNUT.

## LOCKNUTS.

Size...	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Each..	.25	.27	.34	.47	.64	.85	.90	1.30	1.70	2.35	2.70	3.00	4.00

BUSHING.  
Reduces more than one size

## BUSHINGS.

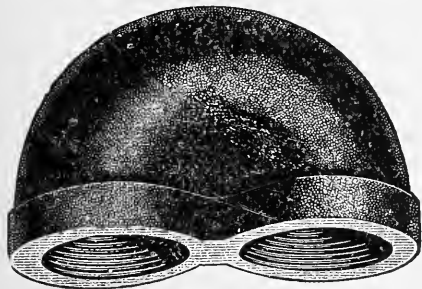
Size.....	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2
Each.....	.04	.04	.05	.06	.07	.09	.14	.21	.30	.40
Size.....	4	4 1/2	5	6	7	8	9	10	12	
Each.....	.50	.75	.93	1.25	1.87	2.75	3.25	3.75	5.00	

Lists for Galvanized Cast Iron Fittings, page 24.

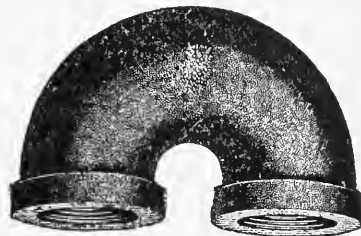
Schedules of Reducing Sizes, pages 17 and 18.



# CAST IRON FITTINGS.—Continued.



Close.



Open.

## RETURN BENDS—CLOSE PATTERN.

Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Centre to centre .....	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{3}{4}$	$2\frac{1}{8}$	$2\frac{1}{2}$	$3\frac{3}{8}$	$3\frac{1}{2}$	$4\frac{1}{4}$	$4\frac{3}{4}$	$5\frac{7}{8}$
Each .....	.18	.20	.22	.28	.40	.57	1.20	1.70	4.00	5.00
Right and Left or L. H., each .....	.21	.23	.26	.33	.46	.66	1.40	1.95		
With Pitch, to order, each .....	---	.23	.26	.33	---	---	---	---		

## RETURN BENDS—OPEN PATTERN.

Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Centre to centre .....	$1\frac{3}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$5\frac{7}{16}$	$6\frac{7}{16}$	$7\frac{3}{8}$	$8\frac{1}{2}$
Each .....	.25	.26	.30	.40	.55	.80	1.35	2.20	4.50	5.75
Right and Left, or L. H., each .....	.30	.30	.35	.46	.64	.92	1.55	2.50		



Back Outlet.



Lateral Branch Y.

## RETURN BENDS—BACK OUTLET.

Size .....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Centre to centre .....	$2\frac{1}{8}$	$2\frac{1}{2}$	$3\frac{1}{8}$	$3\frac{1}{4}$	4	5	$6\frac{1}{2}$
Each .....	.38	.42	.60	.80	1.15	2.00	3.00

## “Y” BRANCHES.

Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Each .....	.20	.28	.34	.54	.66	.94	1.66	2.50	3.50
Reducing, each .....	.23	.33	.40	.62	.76	1.08	1.90	2.90	4.00
Size .....	4	$4\frac{1}{2}$	5	6	7	8	10	12	
Each .....	4.00	5.90	7.00	9.20	15.60	22.50	45.00	67.00	
Reducing, each .....	4.60	6.80	8.00	10.60	18.00	26.00	51.75	77.00	

Lists for Galvanized Cast Iron Fittings, page 24.

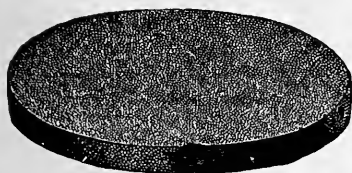
Schedule of Reducing Sizes, pages 17 and 18.

## GALVANIZED CAST IRON FITTINGS.

Size,	Inches,	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	I	$I\frac{1}{4}$	$I\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Elbows, R. H.	---	.10	.12	.10	.12	.16	.21	.32	.40	.56	1.00	1.50	2.10	2.40	3.50	4.00	5.50	9.40	13.50	18.00	27.00	40.00
45° Elbows	---	.12	.14	.12	.14	.20	.24	.38	.48	.68	1.20	1.80	2.50	2.90	4.40	5.00	6.90	11.80	17.00	22.50	34.00	50.00
Reducing Elbows	---	.12	.14	.12	.14	.18	.24	.36	.46	.64	1.20	1.70	2.40	2.80	4.00	4.60	6.30	10.80	15.50	21.00	31.00	46.00
Tees	---	.16	.18	.16	.18	.24	.30	.46	.58	.82	1.46	2.20	3.00	3.50	5.10	6.00	8.00	13.60	19.50	26.00	39.00	58.00
Reducing Tees	---	.18	.20	.18	.20	.28	.34	.54	.66	.94	1.66	2.50	3.50	4.00	5.90	7.00	9.20	15.60	22.50	30.00	45.00	67.00
Crosses	---	.30	.32	.30	.32	.44	.54	.84	1.06	1.50	2.60	4.00	5.40	6.30	9.20	11.00	14.50	24.50	35.00	47.00	70.00	105.00
Return Bends, Close	---	.36	.36	.36	.36	.40	.44	.56	.80	1.14	2.40	3.40	8.00	10.00	---	---	---	---	---	---	---	---
Return Bends, Open	---	.50	.50	.50	.50	.52	.60	.80	1.10	1.60	2.70	4.40	9.00	11.50	---	---	---	---	---	---	---	---
Return Bends, Back Outlet	---	.76	.76	.76	.76	.84	.84	1.20	1.60	2.30	4.00	6.00	---	---	---	---	---	---	---	---	---	---
Flange Unions	---	.80	.80	.80	.80	.92	1.04	1.28	1.56	2.00	2.50	3.00	3.60	4.20	5.40	6.30	7.90	11.00	14.00	20.00	23.00	32.00
Flange Unions, Lip	---	1.00	1.00	1.00	1.00	1.25	1.50	1.65	2.00	2.50	2.90	3.35	4.55	5.00	5.85	6.65	8.35	11.65	16.65	25.00	29.00	34.00
Caps, Cast Iron	---	---	---	---	---	---	---	---	---	.52	.80	1.08	1.50	1.74	2.10	2.40	3.10	5.00	5.70	9.50	11.00	14.00
Reducers, Cast Iron	---	---	---	---	---	---	---	---	---	.86	1.20	1.60	2.00	2.70	3.70	4.00	5.40	10.70	13.50	16.70	20.00	30.00
Locknuts, Cast Iron	---	---	---	---	---	---	---	---	---	.50	.54	.68	.94	1.28	1.70	1.80	2.60	3.40	4.70	5.40	6.00	8.00
Y Bends	---	.40	.40	.40	.40	.56	.68	1.08	1.32	1.88	3.32	5.00	7.00	8.00	11.80	14.00	18.40	31.20	45.00	---	90.00	134.00
Offsets, to offset 4 inches	---	---	---	---	---	.90	1.40	2.00	2.40	3.60	6.00	8.00	10.00	12.00	---	16.00	20.00	---	---	---	---	---
Offsets, to offset 6 inches	---	---	---	---	---	---	2.10	3.00	3.60	5.40	9.00	12.00	15.00	18.00	---	24.00	30.00	---	---	---	---	---
Offsets, to offset 8 inches	---	---	---	---	---	---	2.80	4.00	4.80	7.20	12.00	16.00	20.00	24.00	---	32.00	40.00	---	---	---	---	---
Bushings	---	.08	.08	.08	.08	.10	.12	.14	.18	.28	.42	.60	.80	1.00	1.50	1.85	2.50	3.75	5.50	6.50	7.50	10.00
Plugs	---	.04	.04	.04	.04	.06	.08	.10	.14	.20	.36	.50	.76	.84	1.30	1.75	2.40	3.70	5.50	6.50	7.50	10.00

STANDARD CAST IRON FLANGES.

NOT FACED OR DRILLED.



SOLID FLANGE.

25 per cent. higher than Common Flanges.



COMMON.

SIZE OF PIPE.	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	9	10	12	14	15
Diam. 4	.22	.22	.16	.16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 4 1/2	.25	.25	.25	.25	.22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 5	.35	.30	.30	.30	.30	.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 5 1/2	.45	.45	.40	.40	.40	.35	.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 6	.50	.50	.42	.40	.40	.42	.42	.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 6 1/2	.65	.60	.60	.60	.55	.50	.50	.50	.65	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 7	.75	.75	.75	.70	.70	.62	.62	.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 7 1/2	.90	.90	.90	.85	.85	.80	.75	.85	.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 8	1.00	1.00	1.00	.95	.95	.90	.90	.90	.90	.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 8 1/2	1.25	1.25	1.25	1.15	1.15	1.10	1.10	1.00	1.00	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 9	.....	.....	1.35	1.35	1.35	1.30	1.25	1.15	1.15	1.15	1.15	1.40	.....	.....	.....	.....	.....	.....	.....	.....
" 9 1/2	.....	.....	.....	1.90	1.90	1.75	1.75	1.60	1.60	1.50	1.25	1.50	1.50	.....	.....	.....	.....	.....	.....	.....
" 10	.....	.....	.....	2.25	2.25	2.15	2.00	1.80	1.50	1.50	1.50	1.50	1.50	.....	.....	.....	.....	.....	.....	.....
" 11	.....	.....	.....	.....	.....	2.50	2.50	2.25	2.25	2.00	1.75	1.75	1.75	2.20	.....	.....	.....	.....	.....	.....
" 12	.....	.....	.....	.....	.....	.....	3.00	3.00	2.75	2.50	2.50	2.20	2.20	2.20	2.80	.....	.....	.....	.....	.....
" 13	.....	.....	.....	.....	.....	.....	.....	3.50	3.50	3.25	3.00	3.00	2.80	2.80	2.80	.....	.....	.....	.....	.....
" 14	.....	.....	.....	.....	.....	.....	.....	4.00	4.00	3.75	3.75	3.50	3.25	3.25	3.25	3.75	4.00	.....	.....	.....
" 15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.00	4.00	4.00	4.50	.....	.....	.....	.....
" 16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5.00	5.00	5.00	5.00	6.00	.....	.....	.....
" 17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6.50	6.50	5.75	5.75	7.00	.....	.....	.....
" 18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.00	8.00	8.00	7.00	7.00	.....	.....	.....
" 19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7.50	7.50	.....	.....	.....
" 20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8.50	8.50	8.50	.....	.....
" 21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.50	9.50	.....	.....

Oval and curved flanges made to order at Special Prices. Galvanized Flanges at double the above Lists.

STANDARD, SOLID AND ECCENTRIC FLANGES,

FACED ONLY, OR FACED AND DRILLED.

PIPE SIZE, Inches.	OUTSIDE DIAM.  Inches.	PRICE, Common Flanges.		TABLE FOR DRILLING.			PRICE, Eccentric Flanges.		PRICE, Solid Flanges.	
		Faced. Each.	Faced and Drilled. Each.	Bolt Circle. Inches.	Number of Bolts.	Size of Bolts.	Faced. Each.	Faced and Drilled. Each.	Faced. Each.	Faced and Drilled. Each.
2	6	1.20	1.50	4 3/4	4	1/2 x 2	.....	.....	1.40	1.70
2 1/2	7	1.40	2.00	5 1/2	4	1/2 x 2 1/2	.....	.....	1.60	2.20
3	7 1/2	1.60	2.25	6	4	1/2 x 2 1/2	3.25	4.00	1.85	2.50
3 1/2	8 1/2	1.80	2.50	7	4	1/2 x 2 1/2	3.60	4.30	2.10	2.80
4	9	2.15	3.00	7 1/2	4	5/8 x 3	4.30	5.15	2.50	3.35
4 1/2	9 1/4	2.50	3.35	7 3/4	8	5/8 x 3	5.00	5.85	2.90	3.75
5	10	2.80	3.65	8 1/2	8	5/8 x 3	5.60	6.50	3.25	4.10
6	11	3.20	4.00	9 1/2	8	5/8 x 3	6.40	7.25	3.70	4.50
7	12 1/2	4.35	5.75	10 3/4	8	5/8 x 3	8.70	10.00	5.00	6.40
8	13 1/2	5.00	6.50	11 3/4	8	5/8 x 3	10.00	11.50	5.75	7.25
9	15	6.75	8.25	13 1/4	12	5/8 x 3 1/2	13.00	14.50	7.75	9.25
10	16	7.75	9.25	14 1/4	12	3/4 x 3 1/2	15.00	16.50	9.00	10.60
12	19	10.50	12.50	17	12	3/4 x 3 1/2	18.00	20.50	14.00	16.00
14	21	13.75	16.00	18 3/4	12	7/8 x 4	23.00	26.00	17.50	19.75
15	22 1/4	18.00	21.00	20	16	7/8 x 4	30.00	33.00	22.50	25.50
16	23 1/2	22.50	26.00	21 1/4	16	7/8 x 4	37.00	41.00	28.00	31.50
18	25	27.50	31.00	22 3/4	16	1 x 4 1/2	40.00	45.00	33.00	36.50
20	27 1/2	30.00	34.00	25	20	1 x 4 1/2	45.00	51.00	36.00	40.00
22	29 1/2	33.75	39.00	27 1/4	23	1 x 4 1/2	50.00	58.00	41.00	46.00
24	31 1/2	41.00	46.00	29 1/4	20	1 x 4 1/2	60.00	68.00	50.00	55.00

The above Flanges are furnished Faced only, unless otherwise ordered.

# SCHEDULE OF STANDARD FLANGES.

Adopted July 18th, 1894, by a Committee of the Master Steam and Hot Water Fitters' Association, a Committee of Mechanical Engineers of the U. S.,  
Comm. Am. Society of Mechanical Engineers. and the leading Valve and Fitting Manufacturers of the U. S. Comm. Master Steam and Hot Water Fitters' Association of the United States.  
CARLETON W. NASON, Chairman. EDWARD P. BATES, Chairman.  
ANDREW J. CALDWELL, ALEXANDER H. JARECKI. A. C. WALWORTH, CHAS. J. GILLIS.  
FRANK H. BALL.

Pipe Size, inches.	Pipe Thickness, $\frac{P+100}{4S} d + .333 \left(1 - \frac{d}{100}\right)$ S=18,000 lbs.	Thickness, inches, nearest fraction.	Stress on Pipe per square inch, at 200 lbs.	Radius of fillet, inches.	Flange Diameter, inches.	Flange Thickness at hub for Iron Pipe, inches.	Flange thickness at Edge, inches.	Width flange face, inches.	Bolt circle diameter, inches.	Number of bolts.	Bolt size diameters, inches.	Bolt length, inches.	Stress on each bolt, per square inch, at bottom of thread at 200 lbs.
2	.409	$\frac{7}{16}$	460	$\frac{1}{8}$	6	1	$\frac{1}{8}$	2	$4\frac{3}{4}$	4	$\frac{1}{2}$	2	825
2½	.429	$\frac{7}{16}$	550	$\frac{1}{8}$	7	1½	$\frac{1}{8}$	$\frac{1}{4}$	$5\frac{1}{2}$	4	$\frac{1}{2}$	$2\frac{1}{4}$	1,050
3	.448	$\frac{1}{2}$	690	$\frac{1}{8}$	7½	1½	$\frac{1}{8}$	$\frac{1}{4}$	6	4	$\frac{1}{2}$	$2\frac{1}{2}$	1,330
3½	.466	$\frac{1}{2}$	700	$\frac{1}{8}$	8½	1½	$\frac{1}{8}$	$\frac{1}{4}$	7	4	$\frac{1}{2}$	$2\frac{1}{2}$	2,530
4	.486	$\frac{1}{2}$	800	$\frac{1}{8}$	9	1½	$\frac{1}{8}$	$\frac{1}{4}$	7½	4	$\frac{1}{2}$	$2\frac{3}{4}$	2,100
4½	.498	$\frac{1}{2}$	900	$\frac{1}{8}$	9½	1½	$\frac{1}{8}$	$\frac{1}{4}$	7¾	8	$\frac{5}{8}$	3	1,430
5	.525	$\frac{1}{2}$	1,000	$\frac{1}{8}$	10	1½	$\frac{1}{8}$	$\frac{1}{4}$	8½	8	$\frac{5}{8}$	3	1,630
6	.563	$\frac{9}{16}$	1,060	$\frac{1}{8}$	11	1½	$\frac{1}{8}$	$\frac{1}{4}$	9½	8	$\frac{5}{8}$	3	2,360
7	.60	$\frac{5}{8}$	1,120	$\frac{1}{8}$	12½	1½	$\frac{1}{8}$	$\frac{1}{4}$	10¾	8	$\frac{5}{8}$	$3\frac{1}{4}$	3,200
8	.639	$\frac{5}{8}$	1,280	$\frac{1}{8}$	13½	1½	$\frac{1}{8}$	$\frac{1}{4}$	11¾	8	$\frac{5}{8}$	$3\frac{1}{2}$	4,190
9	.678	$\frac{11}{16}$	1,310	$\frac{3}{8}$	15	1¾	$\frac{1}{8}$	$\frac{1}{4}$	13¼	12	$\frac{5}{8}$	$3\frac{1}{2}$	3,610
10	.713	$\frac{3}{4}$	1,330	$\frac{3}{8}$	16	2	$\frac{1}{8}$	3	14¼	12	$\frac{3}{4}$	$3\frac{3}{8}$	2,970
12	.79	$\frac{13}{16}$	1,470	$\frac{3}{8}$	19	2	$\frac{1}{8}$	$3\frac{1}{2}$	17	12	$\frac{3}{4}$	$3\frac{3}{4}$	4,280
14	.864	$\frac{7}{8}$	1,600	$\frac{3}{8}$	21	2	$\frac{1}{8}$	$3\frac{1}{2}$	18¾	12	$\frac{7}{8}$	$4\frac{1}{4}$	4,280
15	.904	$\frac{15}{16}$	1,600	$\frac{3}{8}$	22¼	2	$\frac{1}{8}$	$3\frac{3}{8}$	20	16	$\frac{7}{8}$	$4\frac{1}{4}$	3,660
16	.946	$\frac{15}{16}$	1,600	$\frac{3}{8}$	23½	2¼	$\frac{1}{8}$	$3\frac{3}{4}$	21¼	16	$\frac{7}{8}$	$4\frac{1}{4}$	4,210
18	1.02	1	1,690	$\frac{3}{8}$	25	...	$\frac{1}{8}$	$3\frac{1}{2}$	22¾	16	1	$4\frac{3}{4}$	4,540
20	1.09	$\frac{1}{8}$	1,780	$\frac{3}{8}$	27½	...	$\frac{1}{8}$	$3\frac{3}{4}$	25	20	1	5	4,490
22	1.18	$\frac{1}{8}$	1,850	$\frac{3}{8}$	29½	...	$\frac{1}{8}$	$3\frac{3}{4}$	27¼	20	1	$5\frac{1}{2}$	4,320
24	1.25	$\frac{1}{4}$	1,920	$\frac{1}{4}$	31½	...	$\frac{1}{8}$	4	29¼	20	1	$5\frac{1}{2}$	5,130
26	1.30	$\frac{1}{4}$	1,980	$\frac{1}{4}$	34¼	...	$\frac{1}{8}$	$4\frac{1}{8}$	31¼	24	1	$5\frac{1}{2}$	5,030
28	1.38	$\frac{1}{4}$	2,040	$\frac{1}{4}$	36	...	$\frac{1}{8}$	4	33½	28	1	6	5,000
30	1.48	$\frac{1}{2}$	2,000	$\frac{1}{4}$	38	...	$\frac{1}{8}$	$4\frac{3}{8}$	35½	28	$\frac{1}{8}$	$6\frac{1}{4}$	4,590
36	1.71	$\frac{1}{4}$	2,010	$\frac{1}{4}$	44½	...	$\frac{1}{8}$	$4\frac{1}{4}$	42	32	$\frac{1}{8}$	$6\frac{1}{2}$	5,790
42	1.87	2	2,100	$\frac{1}{4}$	51	...	$\frac{1}{8}$	$4\frac{1}{2}$	48½	36	$\frac{1}{4}$	$7\frac{1}{4}$	5,700
48	2.17	$2\frac{1}{4}$	2,130	$\frac{1}{4}$	57½	...	$\frac{1}{8}$	$5\frac{3}{4}$	54¾	44	$\frac{1}{2}$	$7\frac{3}{4}$	6,090

Committee of { WALWORTH MANUFACTURING CO. JENKINS BROS. JARECKI M'F'G CO. WORTHINGTON STEAM PUMP CO. R. D. Wood & Co.  
Manufacturers, { EATON, COLE AND BURNHAM CO. CRANE CO. SNOW STEAM PUMP CO. BALL AND WOOD ENGINE CO. CHAPMAN VALVE M'F'G CO.

# BRANCH TEES.



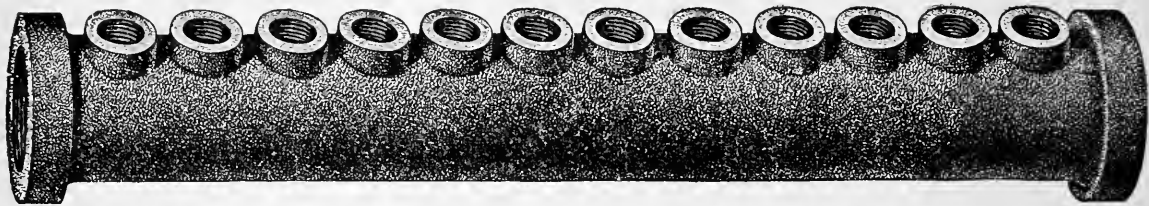
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	2 inch C. to C.			
Price, each....	.90	1.05	1.15	1.35	1.60	1.90	2.20	2.65	3.15	3.75	4.40				
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	2½ inch C. to C.		
Price, each....	.90	1.05	1.15	1.35	1.60	1.90	2.20	2.65	3.15	3.75	4.40	5.00			
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Price, each....	1.00	1.15	1.30	1.45	1.75	2.20	2.45	2.90	3.30	4.50	4.75	5.50	7.00	7.50	8.00
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Price, each....	1.15	1.35	1.60	1.85	2.10	2.45	2.75	3.40	4.00	4.80	5.10	6.00	7.25	7.75	8.25
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	2½ inch C. to C.		
Price, each....	1.75	2.05	2.40	2.75	3.10	3.50	3.75	4.30	5.00	5.50	5.85	6.30			
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	3 inch C. to C.		
Price, each....	1.30	1.65	2.00	2.40	2.80	3.20	3.60	4.30	4.80	5.00	5.25	6.00			
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	3 inch C. to C.		
Price, each....	1.50	1.90	2.40	2.90	3.30	3.90	4.50	5.25	5.85	6.25	6.50	7.00			
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	3 inch C. to C.		
Price, each....	1.95	2.40	2.85	3.55	3.95	4.20	4.95	6.15	6.85	7.25	7.65	8.25			
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	3½ inch C. to C.		
Price, each....	2.10	2.70	3.35	4.00	4.65	5.25	5.85	6.50	7.60	8.00	8.50	9.50			
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	3½ inch C. to C.		
Price, each....	2.85	3.45	4.15	5.00	5.75	6.50	7.00	8.25	9.25	9.75	10.50	11.50			
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	3½ inch C. to C.		
Price, each....	3.15	3.80	4.60	5.50	6.25	7.25	7.75	9.00	10.00	10.75	11.50	12.75			
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	4½ inch C. to C.		
Price, each....	4.10	5.25	6.40	7.65	8.80	10.60	11.50	12.25	13.50	14.25	15.00	16.00			
No. Branches..	2	3	4	5	6	7	8	9	10	11	12	13	4½ inch C. to C.		
Price, each....	4.50	5.75	7.00	8.50	9.75	11.75	12.75	13.50	15.00	15.75	16.50	17.50			

All above prices are for Style A. Tees.

Back or Side Outlets, as shown by Styles B, C and D, are charged as additional Front Outlets. When not otherwise ordered, all openings are tapped right-hand.

Back or Side Outlets larger than the size of Run will add 50 per cent. to above prices.

LARGE MANIFOLDS OR BRANCH TEES.  
FOR DRY KILNS OR HEATING APPARATUS.



BRANCHES, 1 INCH. CENTRE TO CENTRE, 2½ INCH.

Number of Branches,	6	7	8	9	10	12	13
3 inch Run,.....	4.85	5.50	6.20	7.85	8.40	9.70	10.35
4 " " .....	6.25	7.50	8.50	9.60	10.50	12.50	13.25
5 " " .....	7.80	9.40	10.50	12.50	13.50	15.50	16.50
6 " " .....	9.75	11.75	13.00	15.50	16.75	19.50	20.50

Number of Branches,	14	15	16	18	20	22	24
3 inch Run,.....	11.00	11.75	12.50	15.75	17.00	18.50	21.00
4 " " .....	14.50	15.50	16.50	18.50	20.50	23.00	25.00
5 " " .....	18.00	19.25	20.50	23.00	25.50	28.50	31.50
6 " " .....	22.50	24.00	25.50	28.75	31.85	35.50	39.00

BRANCHES, 1¼ INCH. CENTRE TO CENTRE, 3 INCH.

Number of Branches,	6	7	8	9	10	12	13
3 inch Run, .....	5.40	6.25	7.10	8.25	9.20	10.85	11.65
4 " " .....	6.75	7.80	9.00	10.50	11.50	13.50	14.50
5 " " .....	8.50	9.75	11.25	13.25	14.50	17.00	18.25
6 " " .....	10.60	12.20	14.00	16.50	18.00	21.25	22.75

Number of Branches,	14	15	16	18	20	22	24
3 inch Run,.....	12.50	13.40	14.25	16.75	18.50	20.25	22.50
4 " " .....	15.50	16.75	17.80	21.00	23.00	25.00	27.00
5 " " .....	19.50	21.50	22.25	26.25	28.75	31.25	33.75
6 " " .....	24.35	26.75	27.75	32.75	36.00	39.00	42.00

BRANCHES, 1½ INCH. CENTRE TO CENTRE, 3½ INCH.

Number of Branches,	6	7	8	9	10	12	13
3 inch Run,.....	6.25	7.25	7.75	9.00	10.00	11.50	12.75
4 " " .....	7.75	8.80	10.50	11.50	12.75	15.50	16.50
5 " " .....	9.70	11.00	13.00	14.35	16.00	19.35	20.50
6 " " .....	12.15	13.75	16.25	18.00	20.00	24.25	25.50

Number of Branches,	14	15	16	18	20	22	24
3 inch Run,.....	14.00	15.50	16.00	18.25	20.50	22.00	24.00
4 " " .....	17.50	19.00	20.25	22.75	25.00	27.50	30.00
5 " " .....	21.85	23.75	25.25	28.25	31.25	34.35	37.50
6 " " .....	27.25	29.75	31.50	35.30	39.00	43.00	47.00

BRANCHES, 2 INCH. CENTRE TO CENTRE, 4½ INCH.

Number of Branches,	6	7	8	9	10	12	13
3 inch Run,.....	9.75	11.75	12.75	13.50	15.00	16.50	17.50
4 " " .....	11.25	13.00	15.00	16.50	17.60	20.50	22.25
5 " " .....	14.00	16.25	18.75	20.60	22.00	25.50	27.80
6 " " .....	17.50	20.25	23.40	25.75	27.50	31.80	34.75

Number of Branches,	14	15	16	18	20	22	24
3 inch Run,.....	19.00	20.50	22.00	25.00	28.00	30.00	32.00
4 " " .....	24.00	25.50	27.50	31.25	35.00	37.50	40.00
5 " " .....	30.00	32.00	34.30	39.00	43.00	46.75	50.00
6 " " .....	37.50	40.00	43.00	48.75	53.75	58.00	62.00

# HOOK, EXPANSION AND RING PLATES.



Hook Plates.



Expansion Plates.



Ring Plates.

## HOOK PLATES.

Number of Branches.....	2	3	4	5	6	7	8	9	10	11	12
For $\frac{3}{4}$ inch Pipe.....	.16	.21	.24	.28	.34	.40	.45	.50	.56	.68	.72
“ 1 “ “.....	.18	.23	.26	.32	.38	.48	.59	.65	.70	.85	1.00
“ $1\frac{1}{4}$ “ “.....	.21	.27	.32	.41	.52	.68	.80	.90	1.20	1.35	1.40
“ $1\frac{1}{2}$ “ “.....	.28	.43	.58	.72	.88	1.10	1.25	1.40	1.55	1.65	1.90
“ 2 “ “.....	.43	.65	.90	1.15	1.35						



## HOOK, EXPANSION AND RING PLATES—SINGLE.

Size Pipe.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Hook Plates, Single.....	.08	.09	.10	.15	.22
Expansion Plates, Single.....	.12	.15	.17	.25	---
Ring Plates, Single.....	---	.16	.21	---	---

## EXPANSION PLATES AND RING PLATES.

Number of Branches.....	2	3	4	5	6	7	8	9	10	11	12
Expansion Plates, { For $\frac{3}{4}$ inch Pipe.....	.23	.34	.45	.55	.65	.77	.90	1.05	1.25	1.45	1.65
“ { “ 1 “ “.....	.25	.35	.50	.60	.70	.80	.95	1.10	1.35	1.55	1.70
“ { “ $1\frac{1}{4}$ “ “.....	.27	.40	.60	.70	.80	.90	1.15	1.30	1.50	1.70	2.00
“ { “ $1\frac{1}{2}$ “ “.....	.40	.60	.75	.90	1.00	---	---	---	---	---	---
“ { “ 2 “ “.....	.60	.85	1.00	1.35	1.55	2.00	2.45	---	---	---	---
Ring Plates, { For $\frac{3}{4}$ and 1 inch Pipe.....	.28	.41	.50	.62	.72	.96	1.00	1.20	1.30	---	---
“ { “ $1\frac{1}{4}$ inch Pipe.....	.35	.50	.62	.75	1.10	1.25	1.40	---	---	---	---

ROLLS, STANDS, SADDLES AND PIPE HOOKS.



Hanger Rolls.

Size for Pipe.....	1	1¼	1½	2	2½	3	3½	4
Price, Roll only.....each	.06	.07	.08	.12	.12	.12	.21	.21
Length, End to End...ins.	3	3	3	3¼	4¾	4¾	5½	5½

Size for Pipe.....	4½	5	6	7	8	10	12	14
Price, Roll only.....each	.24	.24	.27	.36	.44	.72	1.05	1.32
Length, End to End...ins.	6	6	7¾	8	9	11½	14	17½



Coil Stands—For 1 Inch Pipe.

No. of Pipes.....	3	4	6	8	10	12
Price, per pair.....	.50	.60	.75	1.30	1.60	2.05

PIPE SADDLE.



No. Pipes....	3	4	5	6	7	8	9	10
1 inch.....each	\$ .60	.65	.70	.90	1.00	1.40	1.60	1.75
1¼ inch.....“	.65	.75	.85	1.10	1.40	1.65	1.80	2.00

PIPE HOOKS, WROUGHT IRON.



Size.....	¼	⅜	½	¾	1	1¼	1½	2
Price, per Thousand...	5.25	6.25	7.15	9.10	11.70	14.30	18.20	23.40
“ Hundred.....	.60	.65	.75	1.00	1.25	1.50	2.00	2.50
“ Each.....	.01	.01	.01	.01½	.01½	.02	.02½	.03
WROUGHT PIPE HOOKS. EXTRA HEAVY.								
Price, per Thousand.....	....	10.40	11.00	12.00	15.60	19.50	23.40	31.20
“ Hundred.....	....	1.25	1.35	1.50	1.75	2.10	2.50	3.50
“ Each.....	....	.02	.02	.02½	.03	.03	.03½	.04



# PRICE LIST OF WROUGHT IRON NIPPLES.

IN EFFECT OCTOBER 7, 1899.

## WROUGHT IRON NIPPLES.—THREADED RIGHT HAND.

LENGTH IN INCHES.			SIZES.	PRICES.		PRICES OF EXTRA LONG NIPPLES.											
Close.	Short.	Long.		Close or Short.	Long.	LENGTHS IN INCHES.											
						4	5	6	7	8	9	10	11	12			
$\frac{3}{4}$	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{1}{8}$	\$0.04	\$0.06	\$0.07	\$0.08	\$0.10	\$0.12	\$0.14	\$0.15	\$0.17	\$0.18	\$0.19			
$\frac{7}{8}$	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{1}{4}$	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19			
1	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{3}{8}$	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19			
$1\frac{1}{8}$	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{1}{2}$	.05	.07	.08	.10	.12	.14	.16	.18	.20	.22	.23			
$1\frac{3}{8}$	2	$2\frac{1}{2}$ , 3, $3\frac{1}{2}$ , 4	$\frac{3}{4}$	.06	.09	.11	.13	.17	.18	.20	.22	.24	.26				
$1\frac{1}{2}$	2	$2\frac{1}{2}$ , 3, $3\frac{1}{2}$ , 4	1	.08	.13	.15	.18	.23	.25	.28	.31	.34	.36				
$1\frac{5}{8}$	$2\frac{1}{2}$	3, $3\frac{1}{2}$ , 4, $4\frac{1}{2}$	$1\frac{1}{4}$	.11	.17	.20	.24	.29	.33	.36	.40	.44	.47				
$1\frac{3}{4}$	$2\frac{1}{2}$	3, $3\frac{1}{2}$ , 4, $4\frac{1}{2}$	$1\frac{1}{2}$	.13	.20	.25	.29	.36	.40	.45	.50	.54	.59				
2	$2\frac{1}{2}$	3, $3\frac{1}{2}$ , 4, $4\frac{1}{2}$	2	.18	.27	.32	.38	.50	.54	.59	.65	.72	.77				
$2\frac{1}{8}$	3	$3\frac{1}{2}$ , 4, $4\frac{1}{2}$ , 5	$2\frac{1}{2}$	.39	.59		.68	.90	.97	1.06	1.17	1.26	1.35				
$2\frac{1}{2}$	3	$3\frac{1}{2}$ , 4, $4\frac{1}{2}$ , 5	3	.48	.72		.85	1.08	1.20	1.33	1.45	1.58	1.70				
$2\frac{3}{4}$	4	$4\frac{1}{2}$ , 5, $5\frac{1}{2}$ , 6	$3\frac{1}{2}$	.75	1.05			1.30	1.45	1.60	1.75	1.90	2.05				
3	4	$4\frac{1}{2}$ , 5, $5\frac{1}{2}$ , 6	4	.85	1.20			1.52	1.69	1.87	2.05	2.22	2.40				
3	4	$4\frac{1}{2}$ , 5, $5\frac{1}{2}$ , 6	$4\frac{1}{2}$	1.25	1.70			2.25	2.50	2.75	2.95	3.17	3.40				
$3\frac{1}{2}$	$4\frac{1}{2}$	5, $5\frac{1}{2}$ , 6, $6\frac{1}{2}$	5	1.55	2.45			2.58	2.83	3.10	3.35	3.60	3.85				
$3\frac{3}{4}$	$4\frac{1}{2}$	5, $5\frac{1}{2}$ , 6, $6\frac{1}{2}$	6	1.85	2.90			3.05	3.35	3.70	4.00	4.30	4.65				
4	5	6	7	3.20	3.60			4.05	4.45	4.90	5.30	5.75	6.15				
5	6	8	8	3.55	4.05			4.55	5.05	5.50	6.00	6.50	7.00				
5	6	8	9	5.25	6.50					7.10	7.75	8.40	9.00				
5	6	8	10	6.75	8.25					8.90	9.70	10.40	11.15				
5	6	8	11														
5	6	8	12	8.00	10.00						10.80	11.75	12.70	13.65			

## WROUGHT IRON NIPPLES.—THREADED RIGHT AND LEFT.

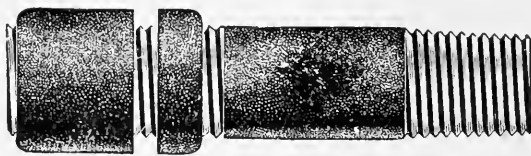
LENGTH IN INCHES.			SIZES.	PRICES.		PRICES OF EXTRA LONG R. AND L. NIPPLES.											
Close.	Short.	Long.		Close or Short.	Long.	LENGTHS IN INCHES.											
						4	5	6	7	8	9	10	11	12			
$\frac{3}{4}$	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{1}{8}$	\$0.05	\$0.08	\$0.09	\$0.11	\$0.13	\$0.16	\$0.18	\$0.20	\$0.23	\$0.25	\$0.27			
$\frac{7}{8}$	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{1}{4}$	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27			
1	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{3}{8}$	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27			
$1\frac{1}{8}$	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{1}{2}$	.07	.10	.11	.13	.16	.18	.21	.24	.27	.29	.31			
$1\frac{3}{8}$	2	$2\frac{1}{2}$ , 3, $3\frac{1}{2}$ , 4	$\frac{3}{4}$	.08	.12	.15	.17	.23	.25	.27	.29	.32	.35				
$1\frac{1}{2}$	2	$2\frac{1}{2}$ , 3, $3\frac{1}{2}$ , 4	1	.11	.18	.20	.24	.31	.33	.37	.41	.45	.48				
$1\frac{5}{8}$	$2\frac{1}{2}$	3, $3\frac{1}{2}$ , 4, $4\frac{1}{2}$	$1\frac{1}{4}$	.15	.23	.27	.32	.39	.45	.50	.55	.60	.65				
$1\frac{3}{4}$	$2\frac{1}{2}$	3, $3\frac{1}{2}$ , 4, $4\frac{1}{2}$	$1\frac{1}{2}$	.18	.27	.34	.39	.48	.52	.60	.67	.72	.80				
2	$2\frac{1}{2}$	3, $3\frac{1}{2}$ , 4, $4\frac{1}{2}$	2	.24	.36	.43	.51	.67	.72	.80	.87	.96	1.03				
$2\frac{1}{8}$	3	$3\frac{1}{2}$ , 4, $4\frac{1}{2}$ , 5	$2\frac{1}{2}$	.52	.79		.91	1.20	1.30	1.40	1.55	1.68	1.80				
$2\frac{1}{2}$	3	$3\frac{1}{2}$ , 4, $4\frac{1}{2}$ , 5	3	.65	.96		1.13	1.44	1.60	1.77	1.93	2.10	2.27				
$2\frac{3}{4}$	4	$4\frac{1}{2}$ , 5, $5\frac{1}{2}$ , 6	$3\frac{1}{2}$	1.00	1.40			1.75	1.95	2.15	2.35	2.55	2.75				
3	4	$4\frac{1}{2}$ , 5, $5\frac{1}{2}$ , 6	4	1.15	1.60			2.00	2.25	2.50	2.75	3.00	3.25				

Add 60 per cent. to above prices for galvanized nipples threaded right and left.

## WROUGHT IRON GALVANIZED NIPPLES—THREADED RIGHT HAND.

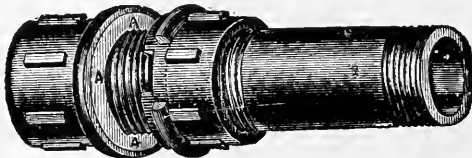
LENGTH IN INCHES.			SIZES.	PRICES.		PRICES OF EXTRA LONG GALVANIZED NIPPLES.											
Close.	Short.	Long.		Close or Short.	Long.	LENGTHS IN INCHES.											
						4	5	6	7	8	9	10	11	12			
$\frac{3}{4}$	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{1}{8}$	\$0.06	\$0.11	\$0.12	\$0.15	\$0.17	\$0.21	\$0.24	\$0.26	\$0.29	\$0.31	\$0.34			
$\frac{7}{8}$	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{1}{4}$	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34			
1	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{3}{8}$	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34			
$1\frac{1}{8}$	$1\frac{1}{2}$	2, $2\frac{1}{2}$ , 3, $3\frac{1}{2}$	$\frac{1}{2}$	.06	.11	.13	.16	.18	.23	.26	.28	.31	.33	.36			
$1\frac{3}{8}$	2	$2\frac{1}{2}$ , 3, $3\frac{1}{2}$ , 4	$\frac{3}{4}$	.08	.14		.18	.21	.26	.29	.32	.35	.38	.41			
$1\frac{1}{2}$	2	$2\frac{1}{2}$ , 3, $3\frac{1}{2}$ , 4	1	.11	.19		.24	.28	.34	.38	.42	.47	.51	.55			
$1\frac{5}{8}$	$2\frac{1}{2}$	3, $3\frac{1}{2}$ , 4, $4\frac{1}{2}$	$1\frac{1}{4}$	.17	.29		.32	.38	.45	.51	.57	.63	.69	.75			
$1\frac{3}{4}$	$2\frac{1}{2}$	3, $3\frac{1}{2}$ , 4, $4\frac{1}{2}$	$1\frac{1}{2}$	.21	.35		.39	.46	.55	.63	.70	.77	.84	.91			
2	$2\frac{1}{2}$	3, $3\frac{1}{2}$ , 4, $4\frac{1}{2}$	2	.27	.47		.52	.61	.74	.83	.93	1.03	1.13	1.23			
$2\frac{1}{8}$	3	$3\frac{1}{2}$ , 4, $4\frac{1}{2}$ , 5	$2\frac{1}{2}$	.56	.86		1.00	1.26	1.41	1.56	1.71	1.86	2.01				
$2\frac{1}{2}$	3	$3\frac{1}{2}$ , 4, $4\frac{1}{2}$ , 5	3	.70	1.10			1.30	1.60	1.80	2.00	2.20	2.40	2.60			
$2\frac{3}{4}$	4	$4\frac{1}{2}$ , 5, $5\frac{1}{2}$ , 6	$3\frac{1}{2}$	1.20	1.70				2.10	2.35	2.60	2.85	3.15	3.40			
3	4	$4\frac{1}{2}$ , 5, $5\frac{1}{2}$ , 6	4	1.35	1.87				2.30	2.60	2.90	3.20	3.50	3.80			
3	4	$4\frac{1}{2}$ , 5, $5\frac{1}{2}$ , 6	$4\frac{1}{2}$	1.85	2.60				3.30	3.65	4.05	4.45	4.85	5.25			
$3\frac{1}{2}$	$4\frac{1}{2}$	5, $5\frac{1}{2}$ , 6, $6\frac{1}{2}$	5	2.30	3.15				3.75	4.20	4.60	5.00	5.40	5.85			
$3\frac{3}{4}$	$4\frac{1}{2}$	5, $5\frac{1}{2}$ , 6, $6\frac{1}{2}$	6	2.80	4.25				4.50	5.00	5.55	6.05	6.60	7.15			
4	5	6	7	4.25	4.95				5.65	6.55	7.05	7.75	8.45	9.20			
4	5	6	8	5.00	5.80				6.65	7.50	8.35	9.25	10.10	10.95			

LONG SCREWS.



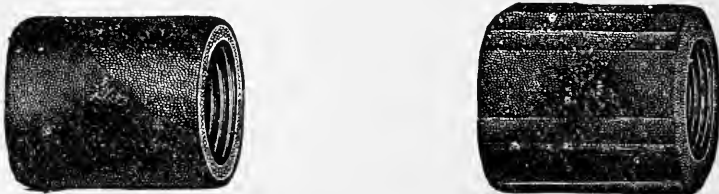
Size .....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price, Black.....	.40	.55	.75	1.00	1.30	1.70	2.70	3.70	5.40	6.60
“ Galvanized .....	.50	.66	1.00	1.25	1.60	2.10	3.10	4.70	5.50	6.75
Standard Lengths. inches	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9

“AMERICAN” LONGSCREW.



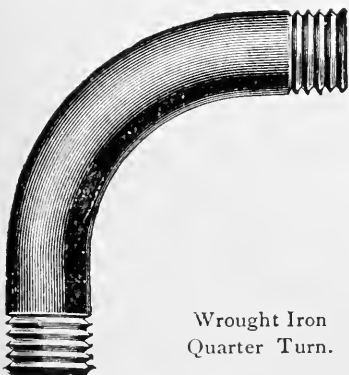
Size .....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
Length Inches.....	3 1/2	4	4 1/2	5	5 1/2	6	7
Plain, each.....	.45	.55	.75	1.00	1.50	2.00	3.37
Galvanized.....	.60	.75	1.00	1.35	2.00	2.70	4.50

IRON COUPLINGS.



Wrought Coupling, Right Hand.      Right and Left Coupling, Cast Iron.

Size of Pipe--	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	10	12
Couplings....	.05	.06	.07	.10	.13	.17	.21	.28	.40	.60	.80	1.00	1.50	1.65	2.40	3.25	4.25	7.50	10.00
“ R. & L..	.07	.08	.11	.15	.20	.25	.30	.50	.85	1.20	1.60	2.00	---	---	---	---	---	---	---
“ Galv'd..	.06	.08	.10	.13	.18	.25	.32	.40	.55	.80	1.05	1.40	2.00	2.25	3.25	---	---	---	---



Wrought Iron  
Quarter Turn.

WROUGHT IRON QUARTER BEND.

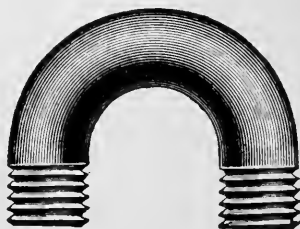
Size----	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Radius..	1	1 1/2	2 1/2	3 1/2	4 1/2	6	8	12	14	16
Each---	.40	.55	.75	1.00	1.30	1.70	2.50	3.50	4.75	6.50

These Bends are made from Standard Extra Heavy Pipe.

WROUGHT IRON  
RETURN BEND.

Size-----	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Radius..	1	1 1/2	2 1/2	3 1/2	4 1/2	6	8	12	14	16
Each----	.65	.95	1.35	1.75	2.35	3.15	4.75	6.75	9.25	12.75

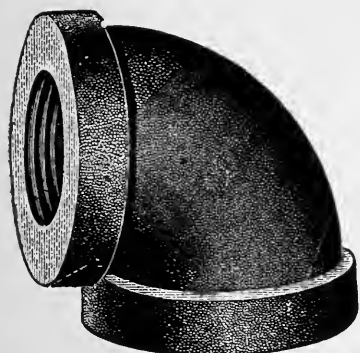
Made from Standard Extra Heavy Pipe.



Wrought Iron Return Bend.

# EXTRA HEAVY CAST IRON FITTINGS.

FOR 200 LBS. WORKING PRESSURE.



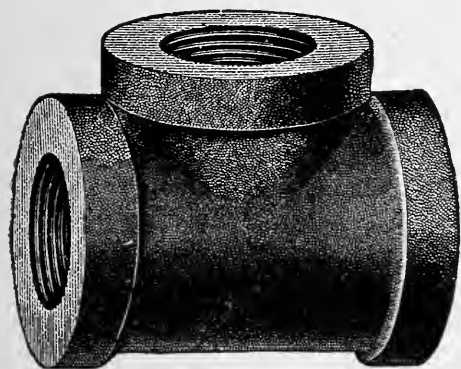
ELBOW.



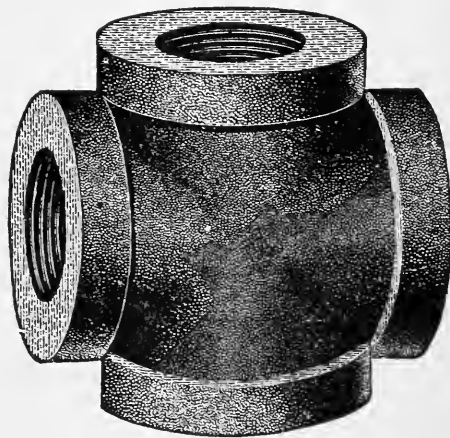
SOLID PLUG.



45° ELBOW.



TEE.

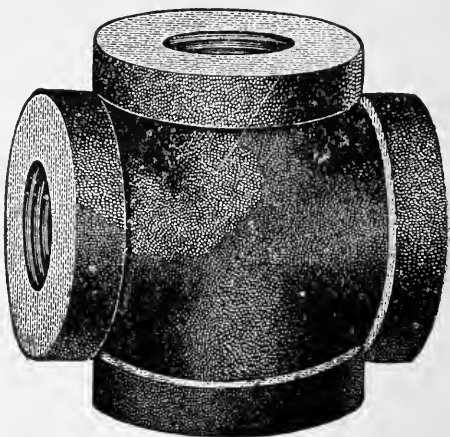
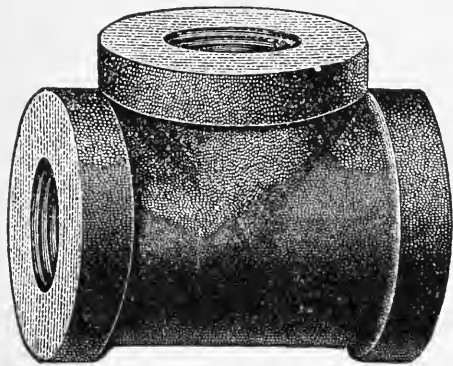


CROSS.

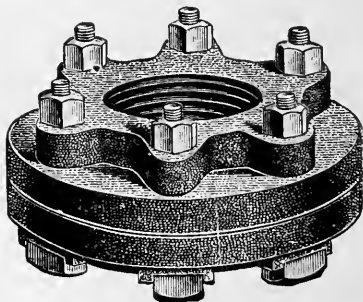
Size,	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Price, Extra Heavy Elbows-----	.30	.35	.45	.60	.75	1.25	2.00	2.75	3.50
“ “ “ “ Reducing-----	.40	.45	.55	.75	.95	1.55	2.50	3.40	4.40
“ “ “ “ 45°-----	.40	.45	.55	.70	.90	1.50	2.50	3.50	4.50
“ “ “ “ R. & L.-----	.40	.45	.55	.75	.95				
“ “ “ “ Tees-----	.50	.55	.70	.90	1.15	1.80	3.00	4.25	5.50
“ “ “ “ Reducing-----	.65	.70	.90	1.15	1.40	2.25	3.75	5.30	6.85
“ “ “ “ Crosses-----	.65	.70	.90	1.20	1.50	2.50	4.00	5.50	7.00
“ “ “ “ Reducing-----	.85	.90	1.15	1.50	1.85	3.15	5.00	6.85	8.75
“ “ “ “ Solid Plugs-----	.05	.06	.10	.13	.20	.35	.50	.75	.85

Size,	$4\frac{1}{2}$	5	6	7	8	10	12	14
Price, Extra Heavy Elbows-----	4.25	5.50	8.00	12.00	17.00	28.00	40.00	-----
“ “ “ “ Reducing-----	5.30	6.80	10.00	15.00	21.00	35.00	50.00	-----
“ “ “ “ 45°-----	5.50	6.75	9.75	14.50	21.00	34.00	48.00	-----
“ “ “ “ Tees-----	6.75	8.25	12.00	18.00	25.00	42.00	60.00	-----
“ “ “ “ Reducing-----	8.50	10.25	15.00	22.50	31.00	52.00	75.00	-----
“ “ “ “ Crosses-----	8.50	11.00	16.00	24.00	34.00	56.00	80.00	-----
“ “ “ “ Reducing-----	10.00	13.75	20.00	30.00	42.00	70.00	100.00	-----
“ “ “ “ Solid Plugs-----	1.35	1.75	2.40	3.75	5.50	7.50	10.00	-----

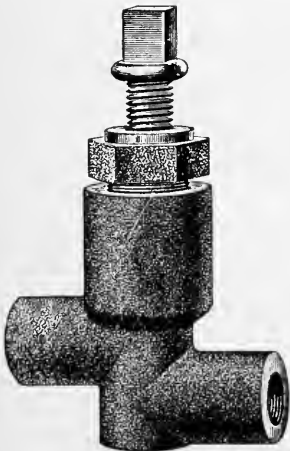
CAST IRON HYDRAULIC FITTINGS.



SUITABLE FOR 1,000 LBS.  
WORKING PRESSURE.



Size.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Hydraulic Elbows	.30	.45	.50	.70	.80	1.25	1.85	2.25	2.75	3.00	4.00	5.00	6.00
Hydraulic " 45°	.45	.65	.75	1.00	1.25	1.75	2.25	2.50	3.00	3.50	4.50	5.25	6.25
Hydraulic Tees...	.45	.65	.75	1.05	1.30	1.90	2.75	3.30	4.00	4.50	6.00	7.50	9.00
Hydraulic Crosses	.60	.90	1.00	1.40	1.60	2.50	3.70	4.50	5.50	6.00	8.00	10.00	12.00
Hyd'lic Flange Unions, with rubber gaskets	1.20	1.30	1.40	1.50	2.00	2.25	3.00	3.50	4.00	4.50	5.00	5.50	6.50



HYDRAULIC BRASS  
FITTINGS AND VALVES.

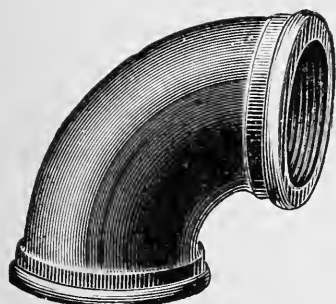
SUITABLE FOR 2,000 LBS. WORKING  
PRESSURE.



Size.....	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Elbows.....\$	.60	.85	1.40	1.90	2.40	3.80	5.30	9.00		
Tees .....	.90	1.25	1.85	2.75	3.65	5.85	7.80	15.00		
Crosses .....	1.22	1.66	2.48	3.70	4.90	7.70	10.38	20.00		
Couplings .....	.60	.85	1.00	1.42	1.86	2.72	4.00	7.20		
Unions.....	1.60	1.95	2.20	2.70	3.30	4.80	6.40	8.30	11.25	17.00
Flange Unions			4.50	6.15	7.90	9.60	11.40	13.55	16.20	18.60
Valves .....	4.30	4.65	5.65	7.40	11.00	18.00	25.00	45.00		
Valves, Check	3.65	4.15	5.00	6.15	10.00	17.00	22.00	41.00		

## CAST IRON FITTINGS.

### LONG TURN PATTERN.

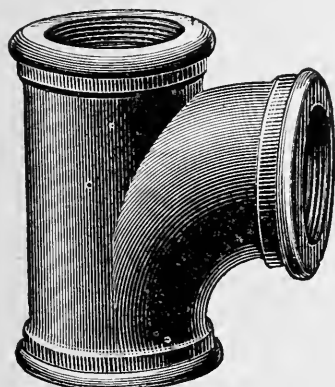


No. 1. (ELBOW.)

#### No. 1. ELBOW.

Size..	1	1¼	1½	2	2½	3	3½	4
Each.	.32	.40	.55	.80	1.20	2.25	3.25	3.50

Size..	4½	5	6	7	8	9	10	12
Each.	5.50	6.50	8.75	13.00	17.00	25.50	30.00	40.00



No. 3. (TEE.)

#### No. 3. TEE.

Size..	1	1¼	1½	2	2½	3	3½	4
Each.	.48	.60	.82	1.20	1.80	3.40	4.90	5.25

Size..	4½	5	6	7	8	9	10	12
Each.	8.25	9.75	13.75	19.50	25.50	38.00	45.00	60.00



No. 2. (ELBOW.)

#### No. 2. ELBOW DOUBLE BRANCH.

Size..	1	1¼	1½	2	2½	3	3½	4
Each.	.64	.80	1.10	1.60	2.40	4.50	6.50	7.00

Size..	4½	5	6	7	8	9	10	12
Each.	11.00	13.00	17.50	26.00	34.00	51.00	60.00	80.00



No. 4. (CROSS.)

#### No. 4. CROSS.

Size..	1	1¼	1½	2	2½	3	3½	4
Each.	.85	1.10	1.50	2.15	3.20	6.00	8.75	9.50

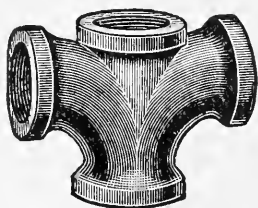
Size..	4½	5	6	7	8	9	10	12
Each.	15.00	17.50	24.00	35.00	45.00	68.00	80.00	107.00

## RECESSED FITTINGS

### FOR WROUGHT IRON DRAINAGE SYSTEM.



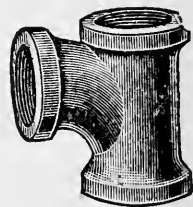
T Y WITH  
SIDE OUTLET.



DBL. T Y BRANCH.



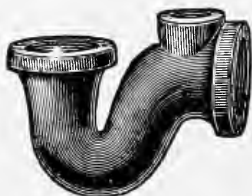
Y BRANCH.



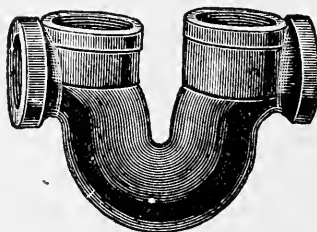
T Y BRANCH.



TEE.



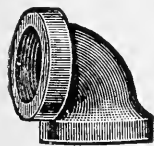
P TRAP.



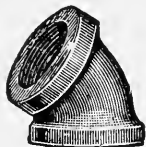
RUNNING TRAP.



90° LONG BEND.



90° BEND.



60° BEND.



45° BEND.



22½° BEND.



11¼° BEND.

SIZES.	1½ in.	2 in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	10 in.
11¼° Bend .....	.50	.60	1.10	1.70	2.60	3.50	6.00	7.00	9.00
22½° Bend .....	.50	.60	1.10	1.70	2.60	3.50	6.00	7.00	9.00
45° Bend .....	.50	.60	1.10	1.70	2.60	3.50	6.00	7.00	9.00
60° Bend .....	.50	.60	1.10	1.70	2.60	3.50	6.00	7.00	9.00
90° Bend .....	.50	.60	1.10	1.70	2.60	3.50	6.00	7.00	9.00
90° Bend, Long .....	.60	.70	1.30	2.00	3.60	5.20	8.50	10.00	12.00
Tee Branch .....	.75	.90	1.40	2.30	4.00	6.00	9.00	12.00	18.00
Y Branch .....	.80	1.00	1.70	2.60	3.50	5.50	12.00	15.00	21.00
Tee Y Branch .....	1.15	1.35	2.25	3.50	5.50	7.00	11.50	14.50	20.00
Dbl. Y Branch .....	1.00	1.30	2.20	3.10	4.25	6.50	15.00	18.00	25.00
Dbl. Tee Y Branch .....	1.25	1.50	3.00	4.00	6.50	8.50	-----	-----	-----
Running Trap .....	---	2.40	3.50	5.00	8.00	15.00	25.00	-----	-----
½ S or P Trap .....	---	2.25	3.00	4.50	7.50	14.00	22.00	-----	-----
Tee Y with 2-inch outlet on side .....	---	---	3.00	3.50	6.50	8.00	-----	-----	-----
Tee Y with 2-inch outlet on two sides .....	---	---	3.50	4.00	7.00	10.00	-----	-----	-----

Long and Short 90° Bends graded ¼ inch to the foot unless otherwise ordered.

Galvanized Fittings, double above lists.



# MALLEABLE IRON, GAS, WATER AND STEAM FITTINGS.

ADOPTED BY THE MANUFACTURERS' ASSOCIATION.

CLASS A		Price, 30 cents per pound.
Elbows, $\frac{1}{8}$ , $\frac{1}{4} \times \frac{1}{8}$ , $\frac{3}{8} \times \frac{1}{8}$ .	R. and L. Couplings, $\frac{1}{8}$ in.	Ells, R. and L., $\frac{1}{4}$ and $\frac{3}{8}$ in.
Tees, $\frac{1}{8}$ , $\frac{1}{8} \times \frac{1}{4}$ , $\frac{1}{4} \times \frac{1}{8}$ , $\frac{3}{8} \times \frac{1}{8}$ .	Couplings, R. H., $\frac{1}{8}$ in.	R. and L. Return Bends, $\frac{3}{8}$ and $\frac{1}{2}$ in.
Reducers, $\frac{1}{4} \times \frac{1}{8}$ , $\frac{3}{8} \times \frac{1}{8}$ .		
CLASS B		Price, 20 cents per pound.
Elbows, $\frac{3}{8}$ , $\frac{1}{4}$ , $\frac{3}{8} \times \frac{1}{4}$ , $\frac{1}{2} \times \frac{1}{4}$ in.	Drop Ells and Tees, $\frac{1}{2}$ in. & smaller.	R. and L. Elbows, $\frac{1}{2}$ in.
Tees, $\frac{1}{4}$ , $\frac{3}{8}$ , $\frac{1}{4} \times \frac{3}{8}$ , $\frac{3}{8} \times \frac{1}{4} \times \frac{1}{4}$ , $\frac{3}{8} \times \frac{1}{4}$ , $\frac{3}{8} \times \frac{1}{4} \times \frac{3}{8}$ .	Caps, $\frac{1}{4}$ and $\frac{3}{8}$ in.	Waste Nuts, $\frac{3}{4}$ in. and smaller.
Elbows, Side Outlets, $\frac{1}{2}$ in. & smaller.	Lock Nuts, $\frac{1}{4}$ , $\frac{3}{8}$ and $\frac{1}{2}$ in.	Chandelier Hooks, all sizes.
Tees, Side Outlets, $\frac{1}{2}$ in. and smaller.	Reducing Couplings, $\frac{3}{8} \times \frac{1}{4}$ to $\frac{3}{4} \times \frac{3}{8}$ , inclusive.	Return Bends, $\frac{3}{8}$ and $\frac{1}{2}$ in.
Street Ells, $\frac{1}{4}$ and $\frac{3}{8}$ in.	Extension Pieces, $\frac{3}{8}$ and $\frac{1}{2}$ in.	Return Bends, R. and L., $\frac{3}{4}$ , 1 in.
Crosses, $\frac{1}{4}$ , $\frac{3}{8}$ , $\frac{1}{2}$ in.	R. and L. Couplings, $\frac{1}{4}$ and $\frac{3}{8}$ in.	Wall Plates, all sizes.
Reducing Crosses, 1 in. and smaller.	R. Hand Couplings, $\frac{1}{4}$ and $\frac{3}{8}$ in.	45° Ells, $\frac{1}{2}$ in. and smaller.
		Y's, $\frac{1}{2}$ , $\frac{3}{4}$ in.
CLASS C		Price, 16 cents per pound.
Elbows, $\frac{1}{2}$ , and $\frac{1}{2} \times \frac{3}{4}$ .	Drop Tees, $\frac{3}{4}$ in. and larger.	Extension Pieces, $\frac{3}{4}$ in. and larger.
Elbows, R. and L., $\frac{3}{4}$ , 1 in.	Caps, $\frac{1}{2}$ , $\frac{3}{4}$ and 1 in.	Waste Nuts, 1 in. and larger.
Tees, $\frac{1}{2}$ and $\frac{1}{2}$ in., reducing.	Lock Nuts, $\frac{3}{4}$ , 1, $1\frac{1}{4}$ in.	Return Bends, $\frac{3}{4}$ , 1 in.
Elbows, Side Outlets, $\frac{3}{4}$ in. & larger.	Reducing Couplings, $\frac{3}{4} \times \frac{1}{2}$ to 1 in., inclusive.	45° Ells, $\frac{3}{4}$ to 2 in., inclusive.
Tees, Side Outlets, $\frac{3}{4}$ in. and larger.	R. and L. Couplings, $\frac{1}{2}$ , $\frac{3}{4}$ in.	Y's, 1 in. and larger.
Street Ells, $\frac{1}{2}$ , $\frac{3}{4}$ , $\frac{3}{4} \times \frac{1}{2}$ , 1 x $\frac{3}{4}$ in.	R. H. Couplings, $\frac{1}{2}$ , $\frac{3}{4}$ in.	Return Bends, R. and L., $1\frac{1}{4}$ in. and larger.
Crosses, 1 and $\frac{3}{4}$ in., straight.		
Drop Ells, $\frac{3}{4}$ in. and larger.		
CLASS D		Price, 13 cents per pound.
Elbows and Tees, $\frac{3}{4}$ and 1 in.	Lock Nuts, $1\frac{1}{2}$ in. and larger.	Return Bends, $1\frac{1}{4}$ in. and larger.
Crosses, $1\frac{1}{4}$ in. and larger.	Reducing Couplings, $1\frac{1}{4}$ in. & larger.	R. and L. Couplings, 1 in. and larger.
Street Ells, 1 in. and larger.	R. H. Couplings, 1 and $1\frac{1}{4}$ in.	45° Elbows, $2\frac{1}{2}$ in. and larger.
Caps, $1\frac{1}{4}$ in. and larger.	Such Fittings as have smaller outlets than $\frac{3}{4}$ inch will be classed "C."	
R. and L. Elbows, $1\frac{1}{4}$ and larger.		
CLASS E		Price, 11 cents per pound.
Elbows and Tees, $1\frac{1}{4}$ in. and larger.	Right Hand Couplings, $1\frac{1}{2}$ , 2 in.	Such Fittings in this class that have outlets smaller than 1 inch to be classed "D."

The run of Tees (Bullheads) gives the size for the purpose of classification, and the outlet being larger does not change it. Return Bends, reduced, Return Bends, spread, Elbows tapped on pitch, 15 per cent. added.

PRICE LIST.					
	CLASS A	B	C	D	E
Price, per pound, Black.....	30 cents.	20 cents.	16 cents.	13 cents.	11 cents.
Price, per pound, Galvanized.....	40 cents.	27 cents.	23 cents.	20 cents.	18 cents.

## STANDARD LIST OF GALVANIZED MALLEABLE FITTINGS.

ELBOWS— $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{1}{2} \times \frac{3}{8}$ ,  $\frac{3}{4}$ ,  $\frac{3}{4} \times \frac{1}{2}$ , 1,  $1 \times \frac{3}{4}$ ,  $1\frac{1}{4}$ ,  $1\frac{1}{4} \times 1$ ,  $1\frac{1}{2}$ ,  $1\frac{1}{2} \times 1\frac{1}{4}$ , 2,  $2 \times 1\frac{1}{2}$ ,  $2\frac{1}{2}$ , 3,  $3\frac{1}{2}$ , 4.  
 STREET ELLS— $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , 2.  
 ELBOWS, 45°— $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , 2. TEES.

SIZE.	SIZE.	SIZE.	SIZE.
$\frac{3}{8} \times \frac{3}{8} \times \frac{3}{8}$	1 x $\frac{3}{4} \times 1$	$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{2}$	2 x 2 x $\frac{3}{4}$
$\frac{1}{2} \times \frac{1}{2} \times \frac{3}{8}$	1 x 1 x $\frac{1}{2}$	$1\frac{1}{2} \times 1\frac{1}{4} \times 1\frac{1}{4}$	2 x 2 x 1
$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$	1 x 1 x $\frac{3}{4}$	$1\frac{1}{2} \times 1\frac{1}{4} \times 1\frac{1}{2}$	2 x 2 x $1\frac{1}{4}$
$\frac{1}{2} \times \frac{1}{2} \times \frac{3}{4}$	1 x 1 x 1	$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{2}$	2 x 2 x $1\frac{1}{2}$
$\frac{3}{4} \times \frac{1}{2} \times \frac{1}{2}$	1 x 1 x $1\frac{1}{4}$	$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{4}$	2 x $1\frac{1}{2} \times 2$
$\frac{3}{4} \times \frac{1}{2} \times \frac{3}{4}$	$1\frac{1}{4} \times 1 \times 1$	$1\frac{1}{2} \times 1\frac{1}{2} \times 1$	2 x 2 x 2
$\frac{3}{4} \times \frac{3}{4} \times \frac{3}{8}$	$1\frac{1}{4} \times 1 \times 1\frac{1}{4}$	$1\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{4}$	$2\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2}$
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{2}$	$1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{4}$	$1\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$	3 x 3 x 3
$\frac{3}{4} \times \frac{3}{4} \times \frac{3}{4}$	$1\frac{1}{4} \times 1\frac{1}{4} \times 1$	$1\frac{1}{2} \times 1\frac{1}{2} \times 2$	$3\frac{1}{2} \times 3\frac{1}{2} \times 3\frac{1}{2}$
$\frac{3}{4} \times \frac{3}{4} \times 1$	$1\frac{1}{4} \times 1\frac{1}{4} \times 1\frac{1}{4}$	2 x $1\frac{1}{2} \times 1\frac{1}{2}$	4 x 4 x 4
1 x $\frac{3}{4} \times \frac{3}{4}$	$1\frac{1}{4} \times 1\frac{1}{4} \times 1\frac{1}{2}$	2 x 2 x $\frac{1}{2}$	

COUPLINGS—Right Hand,  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$  and 2.  
 " Right and Left,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$  and 2.  
 " Reducing,  $\frac{3}{4} \times \frac{1}{2}$ ,  $1 \times \frac{3}{4}$ ,  $1\frac{1}{4} \times 1$ ,  $1\frac{1}{2} \times 1\frac{1}{4}$ ,  $2 \times 1\frac{1}{2}$ .  
 CROSSES—Straight Sizes,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$  and 2.  
 LOCKNUTS— $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$  and 2.  
 CAPS— $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$  and 2.  
 FEMALE DROP ELBOWS AND TEES— $\frac{1}{2}$ ,  $\frac{3}{4}$ .

MALLEABLE IRON FITTINGS.  
ELBOWS.



Plain, without Bead, for Gas.



With Bead, for Steam and Water.

SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{8}$ -----	$5\frac{1}{2}$ G	2 x $\frac{1}{2}$ -----	195
$\frac{1}{4}$ x $\frac{1}{8}$ -----	9 G	2 x $\frac{3}{4}$ -----	196
$\frac{3}{8}$ x $\frac{1}{8}$ -----	$14\frac{3}{4}$ G	2 x 1 -----	188
$\frac{1}{4}$ -----	10	2 x $1\frac{1}{4}$ -----	196
$\frac{3}{8}$ x $\frac{1}{4}$ -----	16	2 x $1\frac{1}{2}$ -----	178
$\frac{3}{8}$ -----	$17\frac{1}{2}$	2 -----	214
$\frac{1}{2}$ x $\frac{1}{4}$ -----	$23\frac{1}{2}$	$2\frac{1}{2}$ x $1\frac{1}{2}$ -----	280
$\frac{1}{2}$ x $\frac{3}{8}$ -----	$22\frac{1}{4}$	$2\frac{1}{2}$ x 2 -----	380
$\frac{1}{2}$ -----	26	$2\frac{1}{2}$ -----	385
$\frac{3}{4}$ x $\frac{3}{8}$ -----	45	3 x $1\frac{1}{2}$ -----	500
$\frac{3}{4}$ x $\frac{1}{2}$ -----	38	3 x 2 -----	460
$\frac{3}{4}$ -----	$41\frac{1}{2}$	3 x $2\frac{1}{2}$ -----	536
1 x $\frac{3}{8}$ -----	$52\frac{3}{4}$	3 -----	592
1 x $\frac{1}{2}$ -----	60	$3\frac{1}{2}$ x 3 -----	806
1 x $\frac{3}{4}$ -----	$60\frac{1}{2}$	$3\frac{1}{2}$ -----	830
1 -----	$65\frac{1}{4}$	4 x 2 -----	800
$1\frac{1}{4}$ x $\frac{3}{4}$ -----	91	4 x 3 -----	930
$1\frac{1}{4}$ x 1 -----	98	4 x $3\frac{1}{2}$ -----	950
$1\frac{1}{4}$ -----	97	4 -----	1250
$1\frac{1}{2}$ x $\frac{3}{4}$ -----	130	$4\frac{1}{2}$ -----	1750
$1\frac{1}{2}$ x 1 -----	106	5 -----	2080
$1\frac{1}{2}$ x $1\frac{1}{4}$ -----	144	6 -----	3250
$1\frac{1}{2}$ -----	128		



45° Elbow.

SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{3}{8}$ -----		2 -----	175 B
$\frac{1}{2}$ -----	$24\frac{1}{2}$ B	$2\frac{1}{2}$ -----	309 B
$\frac{3}{4}$ -----	$33\frac{1}{2}$ B	3 -----	593 B
1 -----	54 B	$3\frac{1}{2}$ -----	726 B
$1\frac{1}{4}$ -----	88 B	4 -----	900 B
$1\frac{1}{2}$ -----	119 B		

G. means, Gas Pattern only.  
B. means, Beaded Pattern only.  
Fittings without mark, are both Gas and Beaded up to 2 inches inclusive.  
Fittings  $2\frac{1}{2}$  inches, are Beaded only.  
Fittings 3 inches and larger, with Band only.  
The Approximate Weights are for Beaded, except when made only in Gas Pattern.  
☞ In ordering, be particular to mention Beaded or Gas. ☞

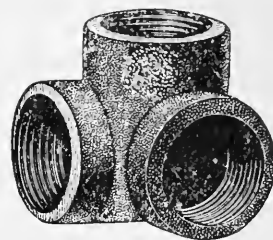


# MALLEABLE IRON FITTINGS.

Continued.



Street Elbows, Male and Female Thread.



Elbows with Side Outlet.

SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$	13 B
$\frac{3}{8}$	16 $\frac{1}{4}$ B
$\frac{1}{2}$	27 $\frac{3}{4}$ B
$\frac{3}{4}$ x $\frac{1}{2}$	45 B
$\frac{3}{4}$	49 $\frac{1}{2}$ B
I x $\frac{3}{4}$	62 B
I	65 B
I $\frac{1}{4}$ x I	88 B
I $\frac{1}{4}$	102 B
I $\frac{1}{2}$ x I $\frac{1}{4}$	146 B
I $\frac{1}{2}$	159 B
2 x I $\frac{1}{2}$	225 B
2	252 B
2 $\frac{1}{2}$	
3	

SIZE.	S. O.	APPROXIMATE WEIGHT PER 100.
$\frac{3}{8}$ x $\frac{3}{8}$ x $\frac{1}{4}$		14 P
$\frac{3}{8}$ x $\frac{3}{8}$ x $\frac{3}{8}$		16 P
$\frac{1}{2}$ x $\frac{1}{2}$ x $\frac{3}{8}$		23 P
$\frac{1}{2}$ x $\frac{1}{2}$ x $\frac{1}{2}$		28 P
$\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{3}{8}$		29 P
$\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{1}{2}$		31 P
$\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$		32 P
I x I x $\frac{3}{8}$		48 P
I x I x $\frac{1}{2}$		54 P
I x I x $\frac{3}{4}$		50 P
I x I x I		58 P
I $\frac{1}{4}$ x I $\frac{1}{4}$ x I		108 P
I $\frac{1}{4}$ x I $\frac{1}{4}$ x I $\frac{1}{4}$		118 P
I $\frac{1}{2}$		151 P



## TEES.

In describing Tees the *run* is first named ;  
then the outlet, thus :

$$\frac{1}{2} \text{ | } \frac{1}{4} = \frac{1}{2} \times \frac{3}{8} \times \frac{1}{4}$$

$$\frac{1}{2} \text{ | } \frac{3}{8} = \frac{1}{2} \times \frac{1}{2} \times \frac{3}{8}$$



SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{8}$	9 G
$\frac{1}{8}$ x $\frac{1}{4}$	9 $\frac{1}{2}$ G
$\frac{1}{8}$ x $\frac{1}{8}$ x $\frac{1}{8}$	10 $\frac{1}{2}$ G
$\frac{1}{4}$ x $\frac{1}{8}$	9 $\frac{3}{4}$ G
$\frac{3}{8}$ x $\frac{1}{8}$	12 $\frac{1}{4}$ G
$\frac{1}{4}$	12
$\frac{1}{4}$ x $\frac{3}{8}$	17
$\frac{3}{8}$ x $\frac{1}{4}$ x $\frac{1}{4}$	18 $\frac{1}{2}$
$\frac{3}{8}$ x $\frac{1}{4}$ x $\frac{3}{8}$	18
$\frac{3}{8}$ x $\frac{1}{4}$	17
$\frac{3}{8}$	18 $\frac{1}{2}$
$\frac{3}{8}$ x $\frac{1}{2}$	23 $\frac{3}{4}$
$\frac{1}{2}$ x $\frac{1}{4}$ x $\frac{3}{8}$	24 $\frac{1}{2}$
$\frac{1}{2}$ x $\frac{1}{4}$ x $\frac{1}{2}$	28 $\frac{1}{2}$
$\frac{1}{2}$ x $\frac{3}{8}$ x $\frac{1}{4}$	24 $\frac{3}{4}$
$\frac{1}{2}$ x $\frac{3}{8}$ x $\frac{3}{8}$	23
$\frac{1}{2}$ x $\frac{3}{8}$ x $\frac{1}{2}$	27
$\frac{1}{2}$ x $\frac{3}{8}$ x $\frac{3}{4}$	40
$\frac{1}{2}$ x $\frac{1}{4}$	23
$\frac{1}{2}$ x $\frac{3}{8}$	25 $\frac{1}{2}$

SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{2}$	29 $\frac{1}{8}$
$\frac{1}{2}$ x $\frac{3}{4}$	41
$\frac{1}{2}$ x I	71
$\frac{1}{2}$ x I $\frac{1}{4}$	120
$\frac{3}{4}$ x $\frac{1}{4}$ x $\frac{3}{4}$	48
$\frac{3}{4}$ x $\frac{3}{8}$ x $\frac{3}{8}$	45
$\frac{3}{4}$ x $\frac{3}{8}$ x $\frac{1}{2}$	43
$\frac{3}{4}$ x $\frac{3}{8}$ x $\frac{3}{4}$	48
$\frac{3}{4}$ x $\frac{3}{8}$ x I	66
$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{1}{4}$	38
$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{3}{8}$	42
$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{1}{2}$	44
$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{3}{4}$	50 $\frac{1}{4}$
$\frac{3}{4}$ x $\frac{1}{2}$ x I	65
$\frac{3}{4}$ x $\frac{1}{4}$	44
$\frac{3}{4}$ x $\frac{3}{8}$	41
$\frac{3}{4}$ x $\frac{1}{2}$	42
$\frac{3}{4}$	50 $\frac{1}{2}$
$\frac{3}{4}$ x I	63
$\frac{3}{4}$ x I $\frac{1}{4}$	114

G means Gas Pattern only.

B means Beaded Pattern only.

Fittings without mark, are both Gas and Beaded up to 2 inches inclusive.

Fittings 2  $\frac{1}{2}$  inches are Beaded only.

Fittings 3 inches and larger, with Band only.

The Approximate Weights are for Beaded, except when made only in Gas Pattern.

**In ordering be particular to mention Beaded or Gas.**

## MALLEABLE IRON FITTINGS.—Continued.

## TEES.—Continued.

SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
I X $\frac{3}{8}$ X $\frac{1}{2}$ -----	54	$1\frac{1}{2}$ X $1\frac{1}{4}$ X I-----	127 $\frac{1}{2}$
I X $\frac{3}{8}$ X $\frac{3}{4}$ -----	63	$1\frac{1}{2}$ X $1\frac{1}{4}$ X $1\frac{1}{4}$ -----	144
I X $\frac{3}{8}$ X I-----	78 $\frac{1}{2}$	$1\frac{1}{2}$ X $1\frac{1}{4}$ X $1\frac{1}{2}$ -----	160
I X $\frac{3}{8}$ X $1\frac{1}{4}$ -----	98 $\frac{1}{2}$	$1\frac{1}{2}$ X $\frac{3}{8}$ -----	104
I X $\frac{1}{2}$ X $\frac{3}{8}$ -----	56	$1\frac{1}{2}$ X $\frac{1}{2}$ -----	112
I X $\frac{1}{2}$ X $\frac{1}{2}$ -----	63	$1\frac{1}{2}$ X $\frac{3}{4}$ -----	116
I X $\frac{1}{2}$ X $\frac{3}{4}$ -----	67 $\frac{1}{2}$	$1\frac{1}{2}$ X I-----	128
I X $\frac{1}{2}$ X I-----	73	$1\frac{1}{2}$ X $1\frac{1}{4}$ -----	156
I X $\frac{1}{2}$ X $1\frac{1}{4}$ -----	108	$1\frac{1}{2}$ -----	160
I X $\frac{3}{4}$ X $\frac{3}{8}$ -----	58 $\frac{1}{2}$	$1\frac{1}{2}$ X $1\frac{1}{4}$ X 2-----	198
I X $\frac{3}{4}$ X $\frac{1}{2}$ -----	60	$1\frac{1}{2}$ X 2-----	180
I X $\frac{3}{4}$ X $\frac{3}{4}$ -----	71 $\frac{1}{4}$	2 X $\frac{3}{8}$ X 2-----	236
I X $\frac{3}{4}$ X I-----	72	2 X $\frac{1}{2}$ X 2-----	226
I X $\frac{3}{4}$ X $1\frac{1}{4}$ -----	105	2 X $\frac{3}{4}$ X 2-----	240
I X $\frac{1}{4}$ -----	59 $\frac{1}{4}$	2 X I X 2-----	224
I X $\frac{3}{8}$ -----	62	2 X $1\frac{1}{4}$ X $1\frac{1}{4}$ -----	201 $\frac{1}{2}$
I X $\frac{1}{2}$ -----	64	2 X $1\frac{1}{4}$ X $1\frac{1}{2}$ -----	231
I X $\frac{3}{4}$ -----	71	2 X $1\frac{1}{4}$ X 2-----	236
I-----	75	2 X $1\frac{1}{2}$ X $\frac{3}{4}$ -----	222
I X $1\frac{1}{4}$ -----	100	2 X $1\frac{1}{2}$ X I-----	224
I X $1\frac{1}{2}$ -----	112	2 X $1\frac{1}{2}$ X $1\frac{1}{4}$ -----	209 $\frac{1}{2}$
I X 2-----	195	2 X $1\frac{1}{2}$ X $1\frac{1}{2}$ -----	224
$1\frac{1}{4}$ X $\frac{3}{8}$ X I-----	114	2 X $1\frac{1}{2}$ X 2-----	244
$1\frac{1}{4}$ X $\frac{3}{8}$ X $1\frac{1}{4}$ -----	133	2 X $\frac{3}{8}$ -----	154
$1\frac{1}{4}$ X $\frac{1}{2}$ X $\frac{3}{4}$ -----	104	2 X $\frac{1}{2}$ -----	160
$1\frac{1}{4}$ X $\frac{1}{2}$ X I-----	108	2 X $\frac{3}{4}$ -----	161
$1\frac{1}{4}$ X $\frac{1}{2}$ X $1\frac{1}{4}$ -----	133 $\frac{1}{2}$	2 X I-----	181
$1\frac{1}{4}$ X $\frac{3}{4}$ X $\frac{1}{2}$ -----	106	2 X $1\frac{1}{4}$ -----	203
$1\frac{1}{4}$ X $\frac{3}{4}$ X $\frac{3}{4}$ -----	100	2 X $1\frac{1}{2}$ -----	220
$1\frac{1}{4}$ X $\frac{3}{4}$ X I-----	116	2-----	268 $\frac{1}{2}$
$1\frac{1}{4}$ X $\frac{3}{4}$ X $1\frac{1}{4}$ -----	132	2 X 2 $\frac{1}{2}$ -----	320 $\frac{1}{2}$
$1\frac{1}{4}$ X I X $\frac{3}{8}$ -----	81	2 $\frac{1}{2}$ X I-----	315
$1\frac{1}{4}$ X I X $\frac{1}{2}$ -----	92	2 $\frac{1}{2}$ X $1\frac{1}{4}$ -----	295
$1\frac{1}{4}$ X I X $\frac{3}{4}$ -----	100	2 $\frac{1}{2}$ X $1\frac{1}{2}$ -----	300
$1\frac{1}{4}$ X I X I-----	116	2 $\frac{1}{2}$ X 2-----	348
$1\frac{1}{4}$ X I X $1\frac{1}{4}$ -----	106 $\frac{1}{4}$	2 $\frac{1}{2}$ -----	470
$1\frac{1}{4}$ X I X $1\frac{1}{2}$ -----	145	2 $\frac{1}{2}$ X 3-----	538
$1\frac{1}{4}$ X $\frac{3}{8}$ -----	89	3 X I-----	525
$1\frac{1}{4}$ X $\frac{1}{2}$ -----	82	3 X $1\frac{1}{4}$ -----	530
$1\frac{1}{4}$ X $\frac{3}{4}$ -----	106	3 X $1\frac{1}{2}$ -----	532
$1\frac{1}{4}$ X I-----	107	3 X 2-----	610
$1\frac{1}{4}$ -----	132	3 X 2 $\frac{1}{2}$ -----	632
$1\frac{1}{4}$ X $1\frac{1}{2}$ -----	156	3-----	745
$1\frac{1}{4}$ X 2-----	169	3 $\frac{1}{2}$ X 2-----	770
$1\frac{1}{2}$ X $\frac{1}{2}$ X I-----	131	3 $\frac{1}{2}$ X 2 $\frac{1}{2}$ -----	950
$1\frac{1}{2}$ X $\frac{3}{8}$ X $1\frac{1}{2}$ -----	167	3 $\frac{1}{2}$ X 3-----	1003
$1\frac{1}{2}$ X $\frac{1}{2}$ X $1\frac{1}{2}$ -----	164	3 $\frac{1}{2}$ -----	1110
$1\frac{1}{2}$ X $\frac{3}{4}$ X I-----	115	4 X 2-----	1182 $\frac{1}{2}$
$1\frac{1}{2}$ X $\frac{3}{4}$ X $1\frac{1}{4}$ -----	140	4 X 2 $\frac{1}{2}$ -----	1245
$1\frac{1}{2}$ X $\frac{3}{4}$ X $1\frac{1}{2}$ -----	155	4 X 3-----	1513
$1\frac{1}{2}$ X I X $\frac{3}{4}$ -----	110	4 X 3 $\frac{1}{2}$ -----	1465
$1\frac{1}{2}$ X I X I-----	125	4-----	2690
$1\frac{1}{2}$ X I X $1\frac{1}{4}$ -----	151	4 $\frac{1}{2}$ -----	4600
$1\frac{1}{2}$ X I X $1\frac{1}{2}$ -----	154 $\frac{1}{2}$	5-----	
$1\frac{1}{2}$ X $1\frac{1}{4}$ X $\frac{1}{2}$ -----	113 $\frac{1}{2}$	6-----	
$1\frac{1}{2}$ X $1\frac{1}{4}$ X $\frac{3}{4}$ -----	112 $\frac{1}{2}$		

G means Gas Pattern only.

B means Beaded Pattern only.

Fittings without mark, are both Gas and Beaded up to 2 inches inclusive.

Fittings  $2\frac{1}{2}$  inches, are Beaded only.

Fittings 3 inches and larger, with Band only.

The Approximate Weights are for Beaded, except when made only in Gas Pattern.

In ordering be particular to mention Beaded or Gas.

# MALLEABLE IRON FITTINGS.

## CROSSES.



The outlets of a Cross are always the same size.

SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$	15 $\frac{3}{4}$	$1\frac{1}{4}$ x $\frac{1}{2}$	106
$\frac{3}{8}$ x $\frac{1}{4}$ x $\frac{1}{4}$	17 $\frac{3}{4}$ G	$1\frac{1}{4}$ x $\frac{3}{4}$	118
$\frac{3}{8}$ x $\frac{1}{4}$	23	$1\frac{1}{4}$ x 1	132
$\frac{3}{8}$	24	$1\frac{1}{4}$	158
$\frac{1}{2}$ x $\frac{3}{8}$ x $\frac{1}{4}$	24 G	$1\frac{1}{2}$ x $1\frac{1}{4}$ x $1\frac{1}{4}$	158 G
$\frac{1}{2}$ x $\frac{3}{8}$ x $\frac{3}{8}$	27 G	$1\frac{1}{2}$ x $\frac{3}{8}$	119
$\frac{1}{2}$ x $\frac{3}{8}$ x $\frac{1}{2}$	28 $\frac{1}{2}$ G	$1\frac{1}{2}$ x $\frac{1}{2}$	114 $\frac{1}{2}$
$\frac{1}{2}$ x $\frac{1}{4}$	27	$1\frac{1}{2}$ x $\frac{3}{4}$	132
$\frac{1}{2}$ x $\frac{3}{8}$	28	$1\frac{1}{2}$ x 1	146
$\frac{1}{2}$	31	$1\frac{1}{2}$ x $1\frac{1}{4}$	185
$\frac{3}{4}$ x $\frac{3}{8}$ x $\frac{1}{2}$	39 G	$1\frac{1}{2}$	198
$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{3}{8}$	39 G	2 x $\frac{3}{8}$	157
$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{3}{4}$	50 G	2 x $\frac{1}{2}$	180
$\frac{3}{4}$ x $\frac{1}{2}$ x $\frac{1}{2}$	44 $\frac{1}{2}$ G	2 x $\frac{3}{4}$	194
$\frac{3}{4}$ x $\frac{1}{4}$	50 $\frac{1}{4}$	2 x 1	226
$\frac{3}{4}$ x $\frac{3}{8}$	50	2 x $1\frac{1}{4}$	252
$\frac{3}{4}$ x $\frac{1}{2}$	52	2 x $1\frac{1}{2}$	262
$\frac{3}{4}$	64	2	288
1 x $\frac{1}{2}$ x $\frac{3}{8}$	52 G	$2\frac{1}{2}$ x $1\frac{1}{4}$	318
1 x $\frac{3}{4}$ x $\frac{3}{8}$	52 G	$2\frac{1}{2}$ x $1\frac{1}{2}$	340
1 x $\frac{3}{4}$ x $\frac{1}{2}$	62 G	$2\frac{1}{2}$ x 2	380
1 x $\frac{3}{4}$ x $\frac{3}{4}$	64 G	$2\frac{1}{2}$	600
1 x $\frac{3}{8}$	68 $\frac{1}{2}$	3 x $1\frac{1}{2}$	520
1 x $\frac{1}{2}$	69	3 x 2	613
1 x $\frac{3}{4}$	72	3 x $2\frac{1}{2}$	688
1	92	3	881
$1\frac{1}{4}$ x 1 x $\frac{3}{4}$	96 G	$3\frac{1}{2}$	1030
$1\frac{1}{4}$ x 1 x 1	105 G	4	1427
$1\frac{1}{4}$ x $\frac{3}{8}$	90		

G means, Gas Pattern only.



B means, Beaded Pattern only.

Fittings without mark, are both Gas and Beaded up to 2 inches inclusive.

Fittings  $2\frac{1}{2}$  inches are beaded only.

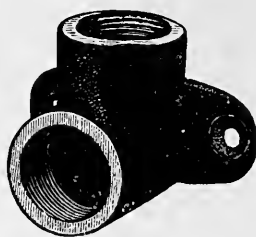
Fittings 3 inches and larger, with Band only.

The Approximate Weights are for Beaded, except when made only in Gas Pattern.

 In ordering, be particular to mention beaded or gas. 

# MALLEABLE IRON FITTINGS.— Continued.

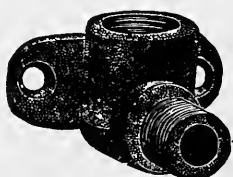
## DROP ELBOWS.



Female.

SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.	SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$	X $\frac{1}{4}$ -----	15 $\frac{1}{2}$ G	$\frac{1}{2}$	X $\frac{3}{8}$ -----	28 $\frac{3}{4}$ G
$\frac{3}{8}$	X $\frac{1}{4}$ -----	20 G	$\frac{3}{4}$	X $\frac{1}{2}$ -----	41 $\frac{1}{2}$ G
$\frac{3}{8}$	X $\frac{3}{8}$ -----	18 G	$\frac{3}{4}$	X $\frac{3}{4}$ -----	36 G
$\frac{1}{2}$	X $\frac{1}{2}$ -----	26 $\frac{1}{2}$ G	I	X I-----	52 $\frac{1}{2}$ G

## DROP ELBOWS.



Male and Female.

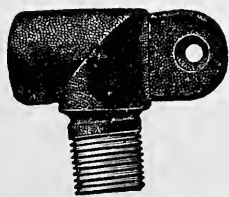


With Long Outlet Piece.

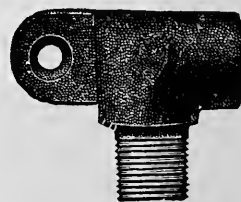
SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.	SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{8}$	X $\frac{3}{8}$ -----	17 G	$\frac{3}{8}$	X $\frac{3}{8}$ -----	25 $\frac{3}{4}$ G
$\frac{1}{4}$	X $\frac{3}{8}$ -----	15 $\frac{1}{2}$ G	$\frac{1}{4}$	X $\frac{3}{8}$ -----	22 G
$\frac{3}{8}$	X $\frac{3}{8}$ -----	19 G			
$\frac{1}{2}$	X $\frac{3}{8}$ -----	32 G			

## DROP ELBOWS.

Flanges. Right or Left.



Flange. Right side.



Flange. Left side.

SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.	SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$	X $\frac{3}{8}$ -----	13 $\frac{1}{2}$ G	$\frac{1}{4}$	X $\frac{3}{8}$ -----	13 $\frac{1}{2}$ G
$\frac{3}{8}$	X $\frac{3}{8}$ -----	17 G	$\frac{3}{8}$	X $\frac{3}{8}$ -----	17 G

G means Gas Pattern only.

B means Beaded Pattern only.

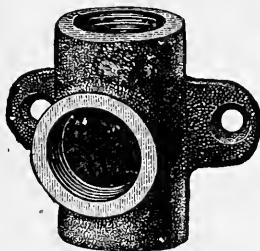
Fittings without mark, are both Gas and Beaded up to 2 inches, inclusive.

Fittings 2 $\frac{1}{2}$  inches, are Beaded only.

Fittings 3 inches and larger with Band only.

The Approximate Weights are for Beaded, except when made only in Gas Pattern.

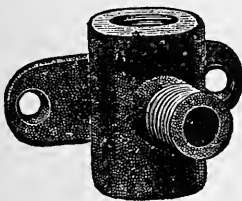
MALLEABLE IRON FITTINGS.—Continued.  
 DROP TEES,



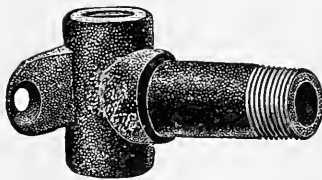
Female.

SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.	SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.
$\frac{3}{8}$ X $\frac{1}{4}$ X $\frac{1}{4}$	-----	18 $\frac{1}{4}$ G	$\frac{3}{4}$ X $\frac{1}{2}$ X $\frac{3}{8}$	-----	49 G
$\frac{3}{8}$ X $\frac{3}{8}$ X $\frac{1}{4}$	-----	17 $\frac{3}{4}$ G	$\frac{3}{4}$ X $\frac{3}{4}$ X $\frac{1}{4}$	-----	39 G
$\frac{3}{8}$ X $\frac{3}{8}$ X $\frac{3}{8}$	-----	10 $\frac{1}{2}$ G	$\frac{3}{4}$ X $\frac{3}{4}$ X $\frac{3}{8}$	-----	44 G
$\frac{1}{2}$ X $\frac{1}{4}$ X $\frac{1}{2}$	-----	29 $\frac{1}{2}$ G	$\frac{3}{4}$ X $\frac{3}{4}$ X $\frac{1}{2}$	-----	45 G
$\frac{1}{2}$ X $\frac{3}{8}$ X $\frac{1}{4}$	-----	24 G	$\frac{3}{4}$ X $\frac{3}{4}$ X $\frac{3}{4}$	-----	57 G
$\frac{1}{2}$ X $\frac{3}{8}$ X $\frac{3}{8}$	-----	26 G	I X $\frac{3}{4}$ X $\frac{3}{8}$	-----	59 G
$\frac{1}{2}$ X $\frac{1}{2}$ X $\frac{1}{4}$	-----	28 G	I X I X $\frac{3}{8}$	-----	58 G
$\frac{1}{2}$ X $\frac{1}{2}$ X $\frac{3}{8}$	-----	27 $\frac{1}{4}$ G	I X I X $\frac{1}{2}$	-----	61 G
$\frac{1}{2}$ X $\frac{1}{2}$ X $\frac{1}{2}$	-----	27 G	I X I X $\frac{3}{4}$	-----	G
$\frac{3}{4}$ X $\frac{1}{2}$ X $\frac{1}{4}$	-----	43 G	I X I X I	-----	G

DROP TEES.



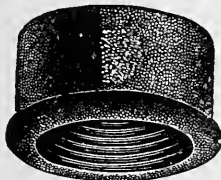
Male and Female.



Male and Female, with long outlet piece.

SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.	SIZE.	DROP.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$ X $\frac{1}{4}$ X $\frac{3}{8}$	-----	17 G	$\frac{3}{4}$ X $\frac{3}{4}$ X $\frac{3}{8}$	-----	31 $\frac{1}{2}$ G
$\frac{3}{8}$ X $\frac{1}{4}$ X $\frac{3}{8}$	-----	18 G	I X $\frac{3}{4}$ X $\frac{3}{8}$	-----	58 $\frac{3}{4}$ G
$\frac{3}{8}$ X $\frac{3}{8}$ X $\frac{3}{8}$	-----	16 $\frac{1}{2}$ G	I X I X $\frac{3}{8}$	-----	51 $\frac{3}{4}$ G
$\frac{1}{2}$ X $\frac{3}{8}$ X $\frac{3}{8}$	-----	31 $\frac{1}{2}$ G	WITH DROP 2 $\frac{1}{2}$ INCHES LONG.		
$\frac{1}{2}$ X $\frac{1}{2}$ X $\frac{3}{8}$	-----	25 $\frac{1}{4}$ G	$\frac{3}{8}$ X $\frac{3}{8}$ X $\frac{3}{8}$	-----	25 $\frac{1}{2}$ G
$\frac{3}{4}$ X $\frac{1}{2}$ X $\frac{3}{8}$	-----	43 G	$\frac{1}{4}$ X $\frac{1}{4}$ X $\frac{3}{8}$	-----	25 $\frac{1}{2}$ G

CAPS.



PLUGS.



SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$	5 G	$\frac{1}{4}$	3 $\frac{3}{4}$
$\frac{3}{8}$	7 $\frac{1}{2}$ G	$\frac{3}{8}$	7
$\frac{1}{2}$	12 $\frac{1}{4}$	$\frac{1}{2}$	10
$\frac{3}{4}$	19 $\frac{1}{4}$	$\frac{3}{4}$	13 $\frac{1}{2}$
I	34 $\frac{1}{2}$	I	28
I $\frac{1}{4}$	58	I $\frac{1}{4}$	46
I $\frac{1}{2}$	68	I $\frac{1}{2}$	58
2	100	2	100
2 $\frac{1}{2}$	188		
3	262		
3 $\frac{1}{2}$	310		
4	468		



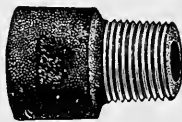
MALLEABLE IRON FITTINGS.  
—Continued.



REDUCING COUPLINGS.

SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$ X $\frac{1}{8}$ -----	6 G	2 X $\frac{1}{2}$ -----	84 $\frac{1}{2}$
$\frac{3}{8}$ X $\frac{1}{8}$ -----	10 $\frac{1}{2}$ G	2 X $\frac{3}{4}$ -----	91
$\frac{3}{8}$ X $\frac{1}{4}$ -----	11 G	2 X 1-----	100
$\frac{1}{2}$ X $\frac{1}{4}$ -----	14 $\frac{1}{2}$ G	2 X 1 $\frac{1}{4}$ -----	98
$\frac{1}{2}$ X $\frac{3}{8}$ -----	15 G	2 X 1 $\frac{1}{2}$ -----	105 $\frac{1}{4}$
$\frac{3}{4}$ X $\frac{1}{4}$ -----	23 G	2 $\frac{1}{2}$ X $\frac{3}{4}$ -----	
$\frac{3}{4}$ X $\frac{3}{8}$ -----	22 G	2 $\frac{1}{2}$ X 1-----	185
$\frac{3}{4}$ X $\frac{1}{2}$ -----	22 $\frac{1}{2}$ G	2 $\frac{1}{2}$ X 1 $\frac{1}{4}$ -----	174 $\frac{1}{2}$
1 X $\frac{1}{4}$ -----	30	2 $\frac{1}{2}$ X 1 $\frac{1}{2}$ -----	177
1 X $\frac{3}{8}$ -----	32	2 $\frac{1}{2}$ X 2-----	189
1 X $\frac{1}{2}$ -----	33 $\frac{1}{2}$	3 X 1-----	256
1 X $\frac{3}{4}$ -----	34 $\frac{3}{4}$	3 X 1 $\frac{1}{4}$ -----	280
1 $\frac{1}{4}$ X $\frac{1}{4}$ -----	44	3 X 1 $\frac{1}{2}$ -----	250
1 $\frac{1}{4}$ X $\frac{3}{8}$ -----	50	3 X 2-----	265
1 $\frac{1}{4}$ X $\frac{1}{2}$ -----	42 $\frac{1}{2}$	3 X 2 $\frac{1}{2}$ -----	300
1 $\frac{1}{4}$ X $\frac{3}{4}$ -----	41 $\frac{1}{2}$	3 $\frac{1}{2}$ X 1 $\frac{1}{2}$ -----	
1 $\frac{1}{4}$ X 1-----	46 $\frac{1}{2}$	3 $\frac{1}{2}$ X 2-----	
1 $\frac{1}{2}$ X $\frac{1}{4}$ -----	60	3 $\frac{1}{2}$ X 2 $\frac{1}{2}$ -----	362
1 $\frac{1}{2}$ X $\frac{3}{8}$ -----	60	3 $\frac{1}{2}$ X 3-----	370
1 $\frac{1}{2}$ X $\frac{1}{2}$ -----	58	4 X 1-----	
1 $\frac{1}{2}$ X $\frac{3}{4}$ -----	62	4 X 2-----	430
1 $\frac{1}{2}$ X 1-----	70	4 X 2 $\frac{1}{2}$ -----	505
1 $\frac{1}{2}$ X 1 $\frac{1}{4}$ -----	68	4 X 3-----	480
2 X $\frac{1}{4}$ -----	83	4 X 3 $\frac{1}{2}$ -----	495
2 X $\frac{3}{8}$ -----	94		

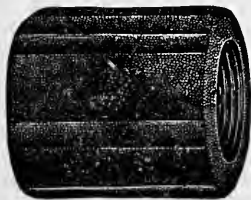
EXTENSION PIECES.



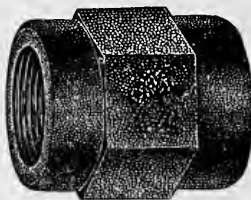
Male and Female.

SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{3}{8}$ X $\frac{3}{8}$ -----	10	$\frac{3}{4}$ X $\frac{3}{4}$ -----	28
$\frac{1}{2}$ X $\frac{1}{2}$ -----	19 $\frac{1}{2}$	1 X 1-----	41 $\frac{1}{2}$
		1 X $\frac{3}{4}$ -----	39
		1 $\frac{1}{4}$ X $\frac{3}{4}$ -----	48

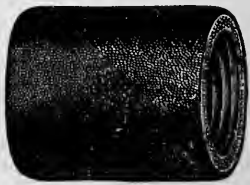
COUPLINGS.



Right and left.



Hexagon Couplings.

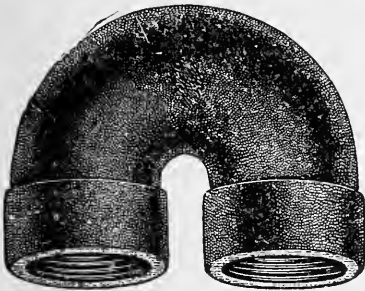


Right Hand.

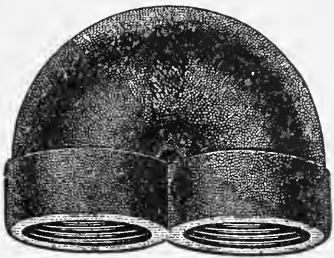
Size.	Apprxt. Wt. per 100. R.&L. Coup	Apprxt. Wt. per 100. Hex. Coup.	Size.	Apprxt. Wt. per 100. R.&L. Coup	Apprxt. Wt. per 100. Hex. Coup.	Size.	Apprxt. Wt. per 100.	Apprxt. Wt. per 100. Beaded.	Size.	Apprxt. Wt. per 100.
$\frac{1}{8}$			1	53 $\frac{1}{4}$	45 $\frac{1}{4}$	$\frac{1}{8}$	4 $\frac{1}{2}$ P		1	47 $\frac{1}{2}$ G
$\frac{1}{4}$	7 $\frac{1}{4}$		1 $\frac{1}{4}$	80 $\frac{1}{2}$	68	$\frac{1}{4}$	6 $\frac{1}{4}$ P		1 $\frac{1}{4}$	70 G
$\frac{3}{8}$	13	11	1 $\frac{1}{2}$	115	99	$\frac{3}{8}$	10 $\frac{1}{2}$ P	7 $\frac{1}{2}$	1 $\frac{1}{2}$	97 G
$\frac{1}{2}$	20 $\frac{1}{2}$	18 $\frac{3}{4}$	2	170	148 $\frac{1}{2}$	$\frac{1}{2}$	18 P		2	148 G
$\frac{3}{4}$	29 $\frac{3}{4}$	30				$\frac{3}{4}$	27 $\frac{1}{4}$ P			

MALLEABLE IRON FITTINGS. — Continued.

RETURN BENDS.



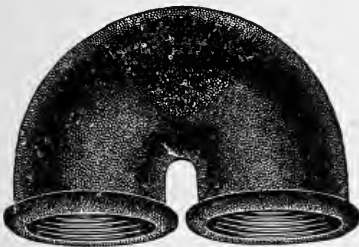
Open Pattern.



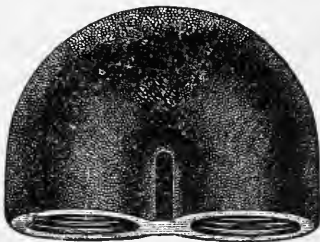
Close Pattern.

SIZE.			APPROXIMATE WEIGHT PER 100—BANDED.	SIZE.			APPROXIMATE WEIGHT PER 100—BANDED.
$\frac{3}{8}$	$1\frac{1}{4}$	C to C.	$21\frac{1}{2}$	$\frac{3}{8}$	$\frac{7}{8}$	C to C.	20
$\frac{1}{2}$	$1\frac{1}{2}$	"	$41\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{8}$	"	35
$\frac{3}{4}$	2	"	$81\frac{3}{4}$	$\frac{3}{4}$	$1\frac{3}{8}$	"	67
1	$2\frac{1}{2}$	"	133	1	$1\frac{3}{4}$	"	100
$1\frac{1}{4}$	3	"	$191\frac{1}{4}$	$1\frac{1}{4}$	$2\frac{1}{8}$	"	164
$1\frac{1}{2}$	$3\frac{1}{2}$	"	$314\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$	"	245
2	$4\frac{3}{8}$	"	557	2	$2\frac{3}{4}$	"	395
$2\frac{1}{2}$	$4\frac{3}{4}$	"	750	$2\frac{1}{2}$	$3\frac{7}{8}$	"	625
3	$6\frac{1}{4}$	"	1085	3	$4\frac{1}{2}$	"	850
$3\frac{1}{2}$	$6\frac{1}{2}$	"					
4	7	"					

RETURN BENDS.



Medium Pattern.



Extra Close Pattern.

SIZE.			APPROXIMATE WEIGHT PER 100—BEADED.	SIZE.			APPROXIMATE WEIGHT PER 100—PLAIN.
$\frac{1}{2}$	$1\frac{1}{4}$	C to C.	37 B	$\frac{3}{4}$	$1\frac{1}{4}$	C to C.	79 G
$\frac{3}{4}$	$1\frac{5}{8}$	"	$55\frac{1}{2}$ B	1	$1\frac{1}{2}$	"	92 G
1	$1\frac{7}{8}$	"	$92\frac{1}{2}$ B				
$1\frac{1}{4}$	$2\frac{1}{4}$	"	163 B				
$1\frac{1}{2}$	$2\frac{1}{2}$	"	244 B				
2	$3\frac{1}{8}$	"	$328\frac{1}{2}$ B				



Y's

SIZE.		APPROXIMATE WEIGHT PER 100—BEADED.	SIZE.		APPROXIMATE WEIGHT PER 100—BEADED.
$\frac{1}{2}$		B	2		437 B
$\frac{3}{4}$		B	$2\frac{1}{2}$		B
1		113 B	3		1000 B
$1\frac{1}{4}$		187 B	$3\frac{1}{2}$		B
$1\frac{1}{2}$		275 B	4		B

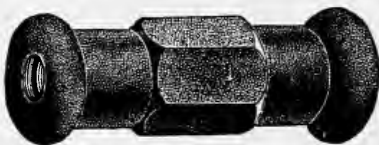
MALLEABLE IRON.

COCK WRENCHES.



Size, Square.....	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{13}{16}$	1	$1\frac{3}{16}$	$1\frac{5}{8}$
Approximate Weight, per 100.....	8	$9\frac{1}{2}$	20	23	35	49	62	100	164

PUMP ROD COUPLINGS.



Size .....	$\frac{3}{8}$	$\frac{3}{8} \times \frac{7}{16}$	$\frac{7}{16}$	$\frac{1}{2}$
Number of Threads to Inch.....	16	$16 \times 14$	14	12
Price, Malleable Iron (per pound), Black.....	.25	.30	.25	.25
“ “ “ “ Galvanized .....	.35	.40	.35	.35

MALLEABLE PIPE RINGS.

Size .....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Price, per Pound.....	.15	.15	.15	.15	.15	.15	.15
Weight, per 100, Approximately...	$10\frac{1}{2}$	17	19	30	36	42	54

Size .....	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	
Price, per Pound.....	.15	.15	.15	.15	.15	
Weight, per 100, Approximately...	64	68	---	114	154	



BUSHINGS.



BUSHING.  
Reduced one size.

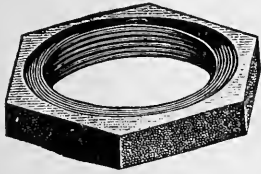
Malleable Iron. Reducing One Size, up to 5 inches.

Size.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5
Price, Black.....	.04	.04	.05	.06	.07	.09	.14	.21	.30	.40	.50	.75	.93
“ Galvanized.....	.08	.08	.10	.12	.14	.18	.28	.42	.60	.80	1.00	1.50	1.85



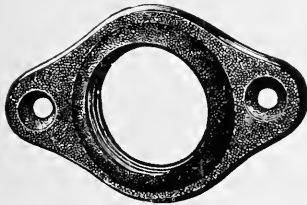
# MALLEABLE IRON FITTINGS.

## LOCK NUTS.



SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$ -----	$3\frac{1}{2}$	$1\frac{1}{2}$ -----	34
$\frac{3}{8}$ -----	$5\frac{3}{4}$	2-----	50
$\frac{1}{2}$ -----	$7\frac{1}{4}$	$2\frac{1}{2}$ -----	185
$\frac{3}{4}$ -----	$12\frac{3}{4}$	3-----	195
1-----	$17\frac{1}{4}$	$3\frac{1}{2}$ -----	270
$1\frac{1}{4}$ -----	$26\frac{1}{4}$	4-----	495

## WASTE NUTS.



## WALL PLATES.



SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$ -----	5	$\frac{3}{8}$ -----	14
$\frac{3}{8}$ -----	7		
$\frac{1}{2}$ -----	10		
$\frac{3}{4}$ -----	$10\frac{1}{4}$		
1-----	$14\frac{1}{2}$		

## CHANDELIER HOOKS.



Loop.



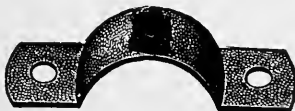
Male, Open Hook.



Female, Open Hook.

SIZE.	APPROXIMATE WEIGHT PER 100.	APPROXIMATE WEIGHT PER 100.	APPROXIMATE WEIGHT PER 100.	SIZE.
$\frac{3}{8}$ -----	$15\frac{1}{2}$	Male.-----	$18\frac{1}{4}$	$\frac{3}{8}$
$\frac{1}{2}$ -----	20	"-----	$27\frac{1}{4}$	$\frac{1}{2}$
		Female.----	20	
		"-----	$21\frac{1}{2}$	

## STRAPS.



SIZE.	APPROXIMATE WEIGHT PER 100.	SIZE.	APPROXIMATE WEIGHT PER 100.
$\frac{1}{4}$ ----	$2\frac{1}{8}$	1-----	10
$\frac{3}{8}$ ----	$2\frac{7}{8}$	$1\frac{1}{4}$ ----	13
$\frac{1}{2}$ ----	$3\frac{1}{2}$	$1\frac{1}{2}$ ----	$16\frac{1}{2}$
$\frac{3}{4}$ ----	6	2-----	$21\frac{1}{2}$

## RE-TINNED WROUGHT STEEL GAS PIPE STRAPS.



For Pipe --	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Per Pound.	.65	.40	.40	.35	.30	.30	.30	.40	.40

G means Gas Pattern only.

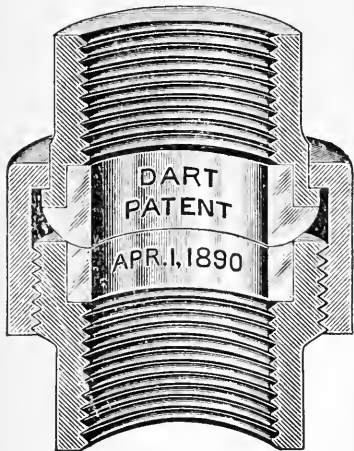
B means Beaded Pattern only.

Fittings without mark, are both Gas and Beaded up to 2 inches, inclusive.

Fittings  $2\frac{1}{2}$  inches are Beaded only.

Fittings 3 inches and larger, with Band only.

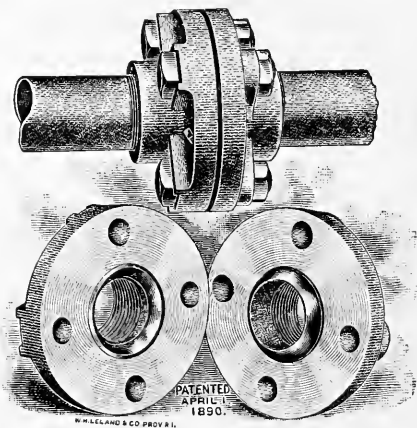
The Approximate Weights are for Beaded, except when made only in Gas Pattern.



THE DART UNION.

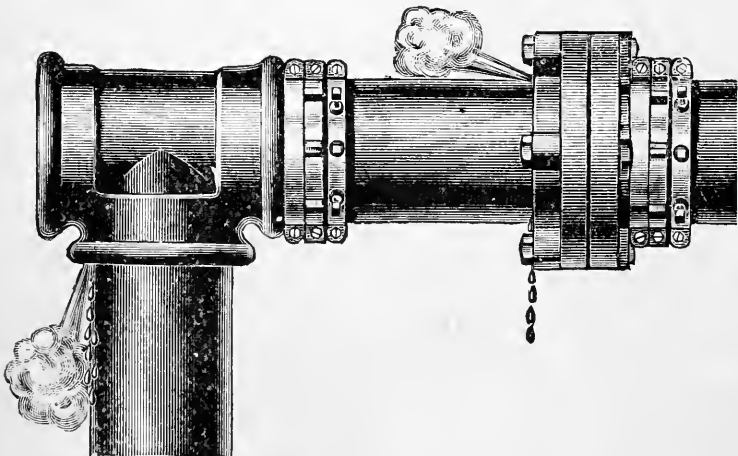
Size, inches.....	1/4	3/8	1/2	3/4	1
Price, Plain.....	\$0.30	.40	.50	.60	.80
Price, Galvanized.....	\$0.45	.60	.75	.90	1.20
Size, inches.....	1 1/4	1 1/2	2	2 1/2	3
Price, Plain.....	\$1.20	1.60	2.00	3.20	4.80
Price, Galvanized.....	\$1.80	2.40	3.00	4.80	6.20

BRONZE SEATS. BALL BEARINGS.  
GROUND JOINTS.



DART'S PATENT FLANGE UNIONS,  
WITH BOLTS AND NUTS.

Size, inches..	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	7	8	9	10
Price.....	\$0.80	1.20	1.60	2.00	2.20	4.80	6.00	7.50	10.00	12.50	15.00	18.00	21.60	28.80



CLIMAX  
STEAM JOINT  
CLAMP.

Will permanently stop leaks in  
Pipe Joints against any  
Pressure.

Clamp for Pipe.....	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5
Each .....	\$1.50	1.50	1.90	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50
Clamp for Pipe..	6	7	8	9	10	12	14	15	16	18	20
Each.....	\$9.00	10.50	13.00	15.75	18.75	22.50	31.50	33.75	36.00	40.50	45.00

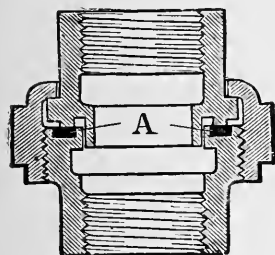


### MALLEABLE UNIONS (With Lip).

Size	-----	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price, Black	-----	.18	.18	.20	.22	.27	.33	.46	.58	.75	1.55	2.10	3.65	4.35
" Galvanized	-----	.27	.27	.30	.33	.40	.50	.70	.90	1.15	2.35	3.15	5.50	6.50

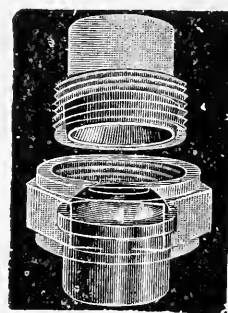
### TWO-THIRD MALLEABLE UNIONS.

Size	-----	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price, Black	-----	.12	.14	.16	.18	.22	.32	.40	.50	1.05	1.40	2.44	2.90
" Galvanized	-----	.18	.21	.24	.27	.33	.48	.60	.75	1.52	2.10	3.60	4.35



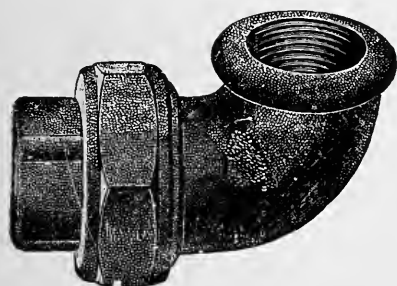
American.

### THE "AMERICAN" AND "KEYSTONE" UNION.



Keystone.

Size	-----	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Plain	-----	.20	.24	.28	.35	.40	.56	.80	.95	2.00	2.75
Galvanized	-----	.24	.28	.35	.46	.55	.78	1.12	1.35	2.90	3.75



Female Sleeve.

### UNION ELBOWS.



Male Sleeve.

Size	-----	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
Price, Black, Female Sleeve	-----	.42	.54	.63	.90	1.05	1.55	2.85
" Galvanized, " "	-----	.63	.81	.95	1.35	1.58	2.35	4.30
" Black, Male "	-----	.48	.62	.72	1.05	1.20	1.80	3.30
" Galvanized, " "	-----	.72	.93	1.08	1.60	1.80	2.70	4.95



Female Sleeve.

### MALLE- ABLE UNION TEES.

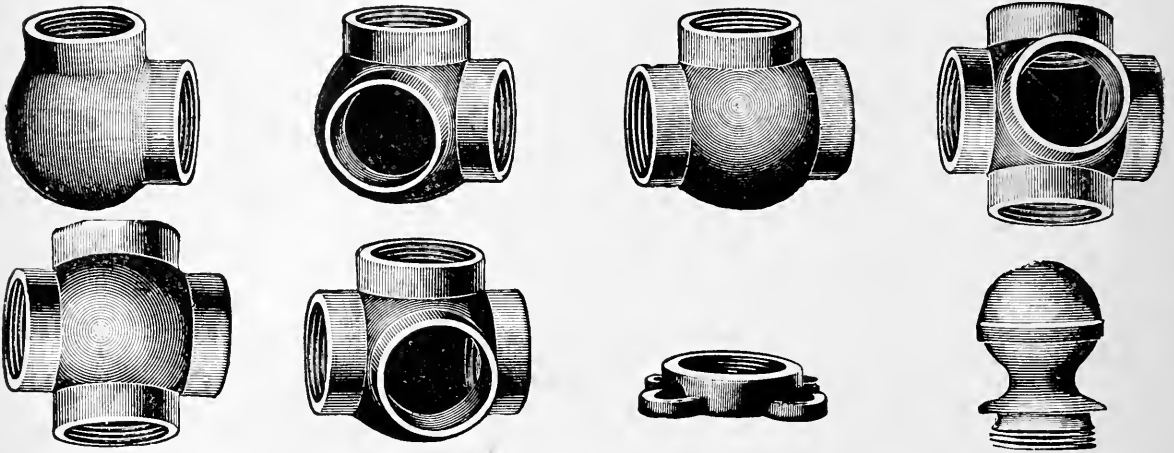


Male Sleeve.

Size	-----	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
Price, Black, Female Sleeve	-----	.45	.57	.70	.95	1.15	1.70	3.20
" Galvanized, " "	-----	.68	.86	1.05	1.45	1.75	2.55	4.80
" Black, Male "	-----	.52	.65	.80	1.10	1.30	1.95	3.70
" Galvanized, " "	-----	.78	1.00	1.20	1.65	1.95	2.95	5.55

## MALLEABLE IRON RAILING FITTINGS.

FOR FENCES, ENCLOSING ENGINES AND MACHINERY, EXHIBITION SPACES, ETC.



In ordering these Railing Fittings be careful to state whether *right hand* or *left hand* threads are wanted. Where Fittings are required having *right and left hand* outlets, please fully describe which are wanted RIGHT HAND and which LEFT HAND. A careful observance of the above will save much trouble and secure the accurate filling of your orders.

Pipe Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Elbow .....	.15	.18	.20	.35	.45	.72	1.00	1.50
“ Side Outlet .....	.20	.23	.25	.40	.50	.80	1.15	1.70
Tee .....	.20	.23	.25	.40	.50	.75	1.20	1.90
“ Side Outlet .....	.30	.33	.35	.45	.55	.90	1.40	2.15
Cross .....	.30	.33	.35	.45	.58	1.00	1.50	2.25
“ Side Outlet .....	.35	.38	.40	.50	.65	1.35	1.75	2.60
Floor Flange .....	.14	.15	.15	.20	.28	.30	.50	.75
Acorn Ornament .....	.16	.18	.20	.25	.35	.90	1.00	1.50
Bushings Reduced one and two sizes ...	...	.06	.07	.10	.12	.18	.28	.40

### LIST OF REDUCING SIZES OF RAILING FITTINGS.

Elbows.	Elbows, Side Outlet.	Tees.	Tees, Side Outlet.	Crosses.
1 x $\frac{1}{2}$	1 x $\frac{1}{2}$ x $\frac{1}{2}$	$\frac{1}{2}$ x $\frac{1}{2}$ x 1	1 x 1 x $\frac{1}{2}$ x $\frac{1}{2}$	1 x 1 x $\frac{1}{2}$ x $\frac{1}{2}$
1 x $\frac{3}{4}$	1 x $\frac{3}{4}$ x $\frac{3}{4}$	$\frac{3}{4}$ x $\frac{3}{4}$ x 1	1 x 1 x $\frac{3}{4}$ x $\frac{3}{4}$	1 x 1 x $\frac{3}{4}$ x $\frac{3}{4}$
$1\frac{1}{4}$ x $\frac{3}{4}$	$1\frac{1}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$	$\frac{3}{4}$ x $\frac{3}{4}$ x $1\frac{1}{4}$	$1\frac{1}{4}$ x $1\frac{1}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$	$1\frac{1}{4}$ x $1\frac{1}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$
$\frac{1}{4}$ x 1	$\frac{1}{4}$ x 1 x 1	1 x 1 x $1\frac{1}{4}$	$\frac{1}{4}$ x $1\frac{1}{4}$ x 1 x 1	$\frac{1}{4}$ x $1\frac{1}{4}$ x 1 x 1
$\frac{1}{2}$ x 1	$\frac{1}{2}$ x 1 x 1	1 x 1 x $1\frac{1}{2}$	$\frac{1}{2}$ x $1\frac{1}{2}$ x 1 x 1	$\frac{1}{2}$ x $1\frac{1}{2}$ x 1 x 1
$1\frac{1}{2}$ x $1\frac{1}{4}$	$1\frac{1}{2}$ x $1\frac{1}{4}$ x $1\frac{1}{4}$	$1\frac{1}{4}$ x $1\frac{1}{4}$ x $\frac{3}{4}$	$1\frac{1}{2}$ x $1\frac{1}{2}$ x $1\frac{1}{4}$ x $1\frac{1}{4}$	$1\frac{1}{2}$ x $1\frac{1}{2}$ x $1\frac{1}{4}$ x $1\frac{1}{4}$
2 x $1\frac{1}{4}$	2 x $1\frac{1}{4}$ x $1\frac{1}{4}$	$1\frac{1}{4}$ x $1\frac{1}{4}$ x 1	2 x 2 x $1\frac{1}{4}$ x $1\frac{1}{4}$	2 x 2 x $1\frac{1}{4}$ x $1\frac{1}{4}$
2 x $1\frac{1}{2}$	2 x $1\frac{1}{2}$ x $1\frac{1}{2}$	$1\frac{1}{4}$ x $1\frac{1}{4}$ x $1\frac{1}{2}$	2 x 2 x $1\frac{1}{2}$ x $1\frac{1}{2}$	2 x 2 x $1\frac{1}{2}$ x $1\frac{1}{2}$
.....	.....	$1\frac{1}{4}$ x $1\frac{1}{4}$ x 2	.....	.....
$2\frac{1}{2}$ x 2	$2\frac{1}{2}$ x 2	$1\frac{1}{2}$ x $1\frac{1}{2}$ x 1	$2\frac{1}{2}$ x $2\frac{1}{2}$ x 2 x 2	$2\frac{1}{2}$ x $2\frac{1}{2}$ x 2 x 2
.....	.....	$1\frac{1}{2}$ x $1\frac{1}{2}$ x $1\frac{1}{4}$	3 x 3 x $2\frac{1}{2}$ x $2\frac{1}{2}$	3 x 3 x $2\frac{1}{2}$ x $2\frac{1}{2}$
3 x $2\frac{1}{2}$	3 x 2	$1\frac{1}{2}$ x $1\frac{1}{2}$ x 2	3 x 3 x 2 x 2	3 x 3 x 2 x 2
.....	.....	2 x 2 x $1\frac{1}{4}$	.....	.....
3 x 2	3 x $2\frac{1}{2}$	2 x 2 x $1\frac{1}{2}$	.....	.....
.....	.....	$2\frac{1}{2}$ x 2	.....	.....
.....	.....	3 x $2\frac{1}{2}$	.....	.....
.....	.....	3 x 2	.....	.....

List on Reducing Sizes same as straight sizes. Advance discount, 15%.

### POLISHED BRASS RAILING FITTINGS.

Sizes .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Ell. ....	.40	.60	.80	1.20	1.60	2.20
Ell, side outlet .....	.75	1.00	1.45	1.65	2.05	2.90
Ell, 45° .....	...	...	1.50	1.70	2.15	3.00
Tee .....	.60	.85	1.10	1.70	2.00	2.75
Tee, side outlet .....	1.05	1.25	1.50	2.00	2.30	3.25
Tee, 45° .....	...	...	1.55	2.05	2.40	3.35
Cross, 45° .....	...	...	1.60	2.20	2.60	3.40
Cross .....	1.05	1.25	1.50	2.00	2.40	3.25
Cross, side outlet .....	1.20	1.45	1.70	2.12	2.60	3.50
Acorn Ornament to drive into pipe—has no thread ...	...	...	.80	.90	1.20	2.50
Floor Flange, plain .....	.26	.35	.40	.70	.95	1.30
Acorn Ornament, threaded—male .....	.40	.65	.80	.90	1.20	2.50

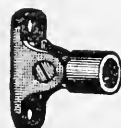
## MALLEABLE AND CAST IRON AWNING FRAME FITTINGS.



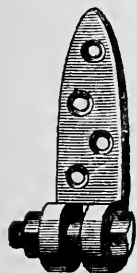
Hinge Plate.



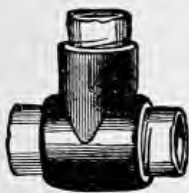
Hinge Socket.



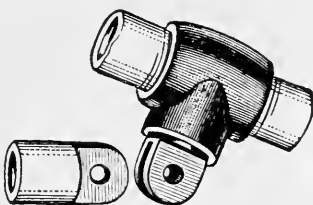
Front—Hinge Bracket—Side.



Wall Eye.



Rail Tee.



Brace Tee.



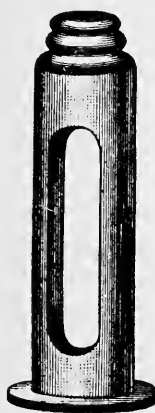
Rail-End Acorn.



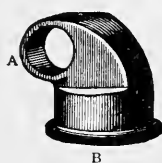
Malleable Iron  
Awning Top.



Cast Iron  
Aw'ng Top.



Cast Iron  
Aw'ng Base.



A,  $1\frac{1}{4}$  Pipe slips through B,  
tapped for 2 in. pipe.



Tapped Here.  
Hitching Post Top.

WALL EYES, (including bolts),	One size suits all sizes of Hinge Sockets.....	\$ .20
HINGE PLATES, " " " " " "	" " " " " "	.18
HINGE SOCKETS, $\frac{3}{4}$ inch.....	Black.....	\$ .15
" " " " " "	$\frac{1}{4}$ Galvanized.....	.06
" " " " " "	$\frac{3}{8}$ ".....	.06
" " " " " "	$\frac{1}{2}$ ".....	.08
HINGE BRACKETS—FRONT, For Window Awning Frames.	$\frac{1}{4}$ , 13c.; $\frac{3}{8}$ , 13c.;	
" " " " " "	With Sockets for $\frac{1}{4}$ , $\frac{3}{8}$ , $\frac{1}{2}$ , & $\frac{3}{4}$ pipe } $\frac{1}{2}$ , 15c.; $\frac{3}{4}$ ,...	.20
" " " " " "	—SIDE, $\frac{1}{4}$ , 13c.; $\frac{3}{8}$ , 13c.; $\frac{1}{2}$ , 15c.; and $\frac{3}{4}$ inch....	.20
RAIL TEES, No. 1	For 1 inch Rail tapped for $\frac{3}{4}$ inch pipe.....	.15
" " No. 2	" $1\frac{1}{4}$ " " " $\frac{3}{4}$ " ".....	.20
" " No. 3	" $1\frac{1}{4}$ " " " 1 " ".....	.20
" " No. 4	" $1\frac{1}{2}$ " " " $1\frac{1}{4}$ " ".....	.25
BRACE TEES. For $\frac{3}{4}$ , 20c.; 1, 28c.; and $1\frac{1}{4}$ inch.....		.33
RAIL END ACORNS. For 1 inch 15c.; $1\frac{1}{4}$ .....		.22
CAST IRON AWNING TOPS. For $1\frac{1}{2}$ and 2 inch posts.....		1.00
CAST IRON AWNING BASE. $1\frac{1}{2}$ inch 1.65; 2 inch.....		1.80
MALLEABLE IRON AWNING TOPS. $1\frac{1}{2}$ for 1 inch Rail.....		.80
" " " " " "	2 for $1\frac{1}{4}$ inch Rail.....	1.00
HITCHING POST TOP. 2 inch, 1.80; $2\frac{1}{2}$ inch, 2.30; 3 inch.....		2.60





BRASS FITTINGS, ROUGH IRON PIPE THREAD, MALLEABLE PATTERN.



Size. ....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Elbows .....	.12	.17	.21	.28	.35	.50	.85	1.10	1.50	3.50	4.50	7.00	10.00
“ Reducing .....	..	.22	.26	.35	.45	.62	1.10	1.40	1.90	4.40	5.65	8.75	12.50
“ 45° .....	..	.20	.25	.35	.50	.75	1.15	1.50	2.25	4.25	7.00	9.00	10.00
“ Side Outlet .....	..	..	.25	.40	.45	.75	1.50	1.80	..	..	..	..	..
Street Elbows .....	..	..	..	.55	.75	1.00	1.80	2.25	3.50	..	..	..	..
Tees .....	.15	.20	.30	.40	.50	.75	1.00	1.30	1.75	4.00	5.50	9.00	13.00
“ Reducing .....	..	.25	.38	.50	.63	.95	1.25	1.65	2.20	5.00	6.90	11.25	16.25
“ Side Outlet .....	..	..	..	.45	.60	1.25	1.70	2.00	..	..	..	..	..
Crosses .....	..	.30	.40	.50	.60	.80	1.50	2.00	3.50	5.00	7.00	10.00	14.50
“ Reducing .....	..	.38	.50	.65	.75	1.00	1.90	2.50	4.40	6.25	8.75	12.50	18.00
Drop Elbows, Female .....	..	.25	.30	.40	.55	.85	..	..	..	..	..	..	..
“ Tees, “ .....	..	..	.35	.45	.85	1.25	..	..	..	..	..	..	..
Caps .....	.15	.15	.20	.25	.35	.45	.60	.80	1.10	2.00	3.00	..	..
Plugs .....	.09	.10	.12	.15	.20	.28	.40	.50	.90	1.25	2.00	3.00	4.00
Reducers, Reducing One Size .....	..	.16	.22	.32	.45	.65	.90	1.12	1.85	3.00	4.50	..	..
Couplings .....	.10	.14	.16	.25	.37	.50	.60	.90	1.35	2.40	3.50	..	..
“ R. & L. ....	..	.17	.20	.30	.45	.60	.75	1.12	1.75	..	..	..	..
Lock Nuts .....	..	.10	.12	.15	.20	.30	.45	.70	.95	1.50	2.75	..	..
Nipples, Close .....	.12	.15	.20	.25	.30	.40	.60	.90	1.25	2.50	3.50	..	..
“ Short to 4" Long ..	.15	.20	.30	.35	.45	.60	.90	1.25	1.60	3.00	4.50	..	..
Bushings, Reducing One Size .....	..	.10	.12	.14	.21	.38	.50	.67	1.00	1.50	2.50	..	..
“ “ Two Sizes .....	..	.10	.12	.14	.21	.38	.50	.67	1.00	1.50	2.50	..	..
Ground Joint Unions .....	.35	.40	.55	.75	1.00	1.40	1.90	2.75	4.00	6.50	8.50	..	..
Return Bends, Open .....	..	..	.40	.50	1.00	1.35	2.00	3.00	4.50	..	..	..	..
“ “ Close .....	..	..	.35	.40	.75	1.15	1.65	2.50	4.00	..	..	..	..

BRASS FITTINGS, FINISHED IRON PIPE THREAD, MALLEABLE PATTERN.

Size. ....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Elbows .....	.24	.34	.42	.56	.70	1.00	1.70	2.20	3.00	7.00	9.00	14.00	20.00
“ Reducing .....	..	.44	.52	.70	.90	1.25	2.20	2.80	3.80	8.80	11.30	17.50	25.00
“ 45° .....	..	.40	.50	.70	1.00	1.50	2.30	3.00	4.50	8.50	14.00	18.00	20.00
“ Side Outlet .....	..	..	.50	.80	.90	1.50	3.00	3.60	..	..	..	..	..
Street Elbows .....	..	..	..	.83	1.10	1.50	2.65	4.50	7.00	..	..	..	..
Tees .....	.30	.40	.60	.80	1.00	1.50	2.00	2.60	3.50	8.00	11.00	18.00	26.00
“ Reducing .....	..	.50	.76	1.00	1.25	1.90	2.50	3.30	4.40	10.00	13.80	22.50	32.50
“ Side Outlet .....	..	..	..	.90	1.20	2.50	3.40	4.00	..	..	..	..	..
Crosses .....	..	.60	.80	1.00	1.20	1.60	3.00	4.00	7.00	10.00	14.00	20.00	29.00
“ Reducing .....	..	.75	1.00	1.30	1.50	2.00	3.80	5.00	8.80	12.50	17.50	25.00	36.00
Drop Elbows, Female .....	..	.50	.60	.80	1.10	1.70	..	..	..	..	..	..	..
Drop Tees, “ .....	..	..	.70	.90	1.70	2.50	..	..	..	..	..	..	..
Caps .....	.30	.30	.40	.50	.70	.90	1.20	1.60	2.20	4.00	6.00	..	..
Plugs .....	.18	.20	.24	.30	.40	.56	.80	1.00	1.80	2.50	4.00	6.00	8.00
Reducers, Reducing One Size .....	..	.32	.44	.64	.90	1.30	1.80	2.25	3.70	6.00	9.00	..	..
Couplings .....	.20	.28	.32	.50	.75	1.00	1.20	1.80	2.70	4.80	7.00	..	..
“ Right and Left .....	..	.31	.36	.55	.82	1.10	1.35	2.00	3.10	..	..	..	..
Ground Joint Unions .....	.32	.36	.50	.70	.90	1.25	1.70	2.50	3.60	6.00	7.75	..	..
Lock Nuts .....	..	.20	.24	.30	.40	.60	.90	1.40	1.90	3.00	5.50	..	..
Bushings .....	..	.20	.24	.28	.42	.76	1.00	1.35	2.00	3.00	5.00	..	..
Return Bends, Open .....	..	..	.80	1.00	2.00	2.70	4.00	6.00	9.00	..	..	..	..
“ “ Close .....	..	..	.70	.80	1.50	2.30	3.30	5.00	8.00	..	..	..	..

BRASS FLANGE UNIONS.—ROUGH.

Size. ....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Price ....	3.50	3.50	3.75	4.25	5.60	6.50	8.50	10.50	13.50	15.00	20.00	22.00	27.00

BRASS FITTINGS, EXTRA HEAVY.



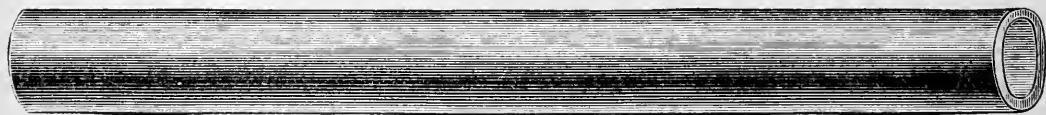
MADE FROM CAST IRON FITTING PATTERNS.

Iron Pipe Thread.

Size.....	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Elbows .....	.36	.50	.85	1.05	1.65	2.10	3.00	5.50	8.50	10.50	12.00	15.00	18.00	27.00
“ Reducing.....	.42	.58	.95	1.20	1.90	2.40	3.45	6.30	9.75	12.00	13.75	17.25	20.70	31.00
“ 45°.....	---	.45	.70	1.20	1.65	2.00	3.00	5.50	8.50	10.50	12.00	15.00	18.00	27.00
Tees .....	.40	.65	1.00	1.50	2.00	3.00	4.50	7.50	11.00	13.00	15.50	20.00	25.00	34.00
“ Reducing.....	.46	.75	1.15	1.70	2.30	3.45	5.20	8.60	12.50	15.00	17.50	23.00	28.00	30.00
Crosses.....	---	.90	1.30	1.80	2.75	4.00	5.25	9.00	14.00	17.00	19.00	26.00	30.00	48.00
“ Reducing.....	---	1.04	1.50	2.10	3.15	4.60	6.00	10.35	16.00	19.50	21.50	29.00	34.00	55.00
Return Bends, Close..	---	1.00	1.15	1.50	2.30	3.30	4.50	9.00	13.00	18.00	23.00	---	---	---
“ “ Open.....	---	1.00	1.25	2.00	3.25	4.50	6.00	9.25	15.50	19.00	25.00	---	---	---
Flange Unions.....	---	1.85	2.30	4.25	5.00	5.50	6.50	9.00	11.00	13.00	18.00	25.00	29.00	35.00

BRASS AND COPPER PIPE.

IRON PIPE SIZES.



Size.....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Inside Diameter.....	.27	.36	.49	.62	.82	1.04	1.38	1.61	2.06	2.46	3.06	3.50	4.02	5.04	6.06
Outside Diameter.....	.33	.46	.61	.78	1.00	1.25	1.56	1.88	2.38	2.78	3.38	4	4 1/2	5.56	6.62
Length, feet.....	12	12	12	12	12	12	12	12	12	12	12	12	12	8-10	6-8
Approximate Weight per foot, Brass.....	.30	.43	.58	.80	1.17	1.67	2.42	2.92	4.17	5.00	8.00	10.00	12.00	15.93	20.69
Approximate Weight per foot, Copper..	.31	.45	.61	.84	1.23	1.75	2.54	3.07	4.38	5.25	8.40	10.50	12.00	17.30	22.38



## FLANGED CAST IRON FITTINGS.

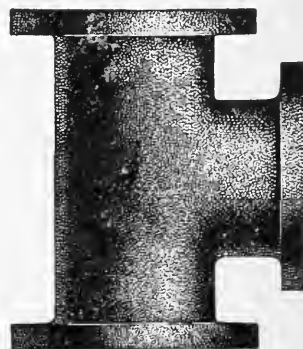
Standard and Extra Heavy Lists, Pages 56, 57, 58 and 59.



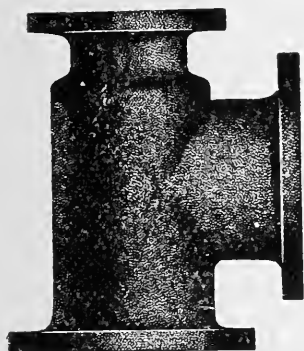
ELBOW.



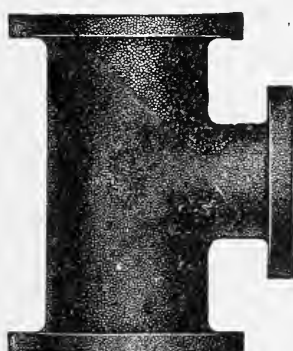
45° ELBOW.



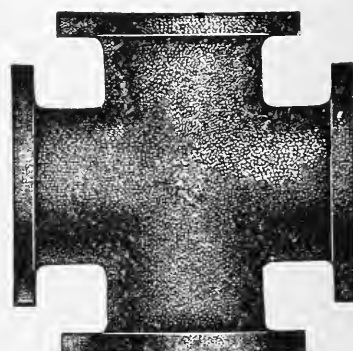
TEE.



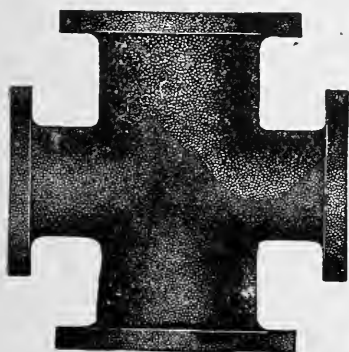
TEE REDUCING IN RUN.



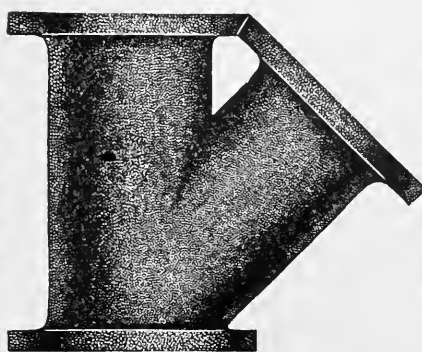
TEE REDUCING AT BRANCH.



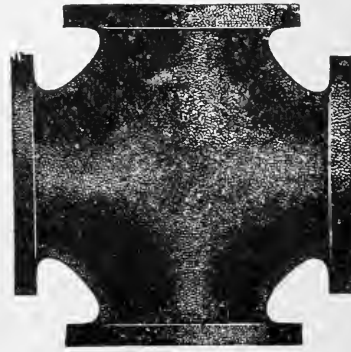
CROSS.



CROSS REDUCING.



STANDARD Y.



LONG TURN CROSS.

# STANDARD FLANGED FITTINGS.

SIZE. Inches	CENTRE TO FACE. Inches	DIAMETER OF FLANGES. Inches	PRICE, ELBOWS.		SIZE. Inches	Centre to Face. Inches	Diameter of Flanges Inches	PRICE, ELBOWS, 45°		SIZE. Inches	CENTRE TO FACE. Inches	FACE TO FACE. Inches	DIAMETER OF FLANGES. Inches	PRICE, TEES.		PRICE, REDUCING TEES.	
			With Flanges Faced and Drilled.	With Flanges Faced.				With Flanges Faced and Drilled.	With Flanges Faced.					With Flanges Faced and Drilled.	With Flanges Faced.	With Flanges Faced and Drilled.	With Flanges Faced.
2	4 1/2	6	4.75	5.75	2	2 1/2	6	5.25	6.25	2	4 1/2	9	6	7.00	8.50	8.25	10.00
2 1/2	4 3/4	7	5.00	6.25	2 1/2	2 3/4	7	5.50	6.75	2 1/2	4 3/4	9 1/2	7	7.25	9.00	9.50	11.25
3	5 1/2	7 1/2	5.75	7.00	3	3	7 1/2	6.25	7.50	3	5 1/2	11	7 1/2	8.25	10.00	11.00	12.75
3 1/2	5 3/4	8 1/2	6.50	7.75	3 1/2	3 1/4	8 1/2	7.25	8.50	3 1/2	5 3/4	11 1/2	8 1/2	9.50	11.25		
4	6	9	7.25	9.25	4	3 1/2	9	8.00	10.00	4	6	12	9	10.50	13.50	12.00	15.00
4 1/2	6 1/4	9 1/4	9.00	11.00	4 1/2	3 1/2	9 1/4	10.00	12.00	4 1/2	6 1/4	12 1/2	9 1/4	13.00	16.00	15.00	18.00
5	7	10	9.75	11.75	5	3 3/4	10	10.75	12.75	5	7	14	10	14.25	17.25	16.25	19.25
6	7 1/2	11	12.00	14.00	6	4 1/4	11	13.00	15.00	6	7 1/2	15	11	17.50	20.50	20.00	23.00
7	8 1/2	12 1/2	16.00	19.75	7	5 1/8	12 1/2	16.00	19.75	7	8 1/2	17	12 1/2	23.00	28.75	26.50	32.00
8	9 1/2	13 1/2	20.00	23.75	8	5 1/4	13 1/2	20.00	23.75	8	9 1/2	19	13 1/2	29.00	34.75	33.50	39.00
9	10 3/4	15	26.00	30.00	9	5 3/8	15	26.00	30.00	9	10 3/4	21 1/2	15	38.00	44.00	43.50	50.00
10	11 1/2	16	32.00	36.00	10	5 7/8	16	32.00	36.00	10	11 1/2	23	16	46.50	52.50	53.50	60.00
12	12 3/4	19	44.00	50.00	12	6 1/2	19	44.00	50.00	12	12 3/4	25 1/2	19	64.00	73.00	74.00	83.00
14	13 1/4	21	58.00	65.00	14	7 1/4	21	58.00	65.00	14	13 1/4	26 1/2	21	84.00	95.00	96.00	107.00
15	14 1/2	22 1/4	72.00	80.00	15	7 1/2	22 1/4	72.00	80.00	15	14 1/2	29	22 1/4	105.00	117.00	120.00	132.00
16	15 1/4	23 1/2	84.00	93.00	16	7 5/8	23 1/2	84.00	93.00	16	15 1/4	30 1/2	23 1/2	122.00	135.00	140.00	153.00
18	16 1/2	25	108.00	118.00	18	7 3/4	25	108.00	118.00	18	16 1/2	33	25	155.00	170.00	178.00	193.00
20	18	27 1/2	135.00	148.00	20	9	27 1/2	135.00	148.00	20	18	36	27 1/2	195.00	215.00	225.00	245.00
22	20	29 1/2	160.00	180.00	22	10	29 1/2	160.00	180.00	22	20	40	29 1/2	230.00	260.00	265.00	295.00
24	22	31 1/2	200.00	220.00	24	10 3/4	31 1/2	200.00	220.00	24	22	44	31 1/2	290.00	320.00	335.00	365.00

Flanged Fittings furnished Faced only, unless otherwise ordered.

Dimensions of straight and reducing sizes are the same.

# STANDARD FLANGED FITTINGS.

SIZE OF FACE. Inches	DIAMETER OF FLANGES. Inches	PRICE, CROSSES.		SIZE	PRICE, REDUCING CROSS.		FACE TO FACE OF RUN Inches	DIAMETER OF FLANGES. Inches	PRICE, Y's.		PRICE, Y's. Reducing at Branch only.		SIZE	FACE TO FACE. In.	DIAMETER OF FLANGES. Inches	PRICE, CROSSES. LONG TURN.	
		With Flanges Faced and Drilled.	With Flanges Faced.		With Flanges Faced and Drilled.	With Flanges Faced.			With Flanges Faced and Drilled.	With Flanges Faced.	With Flanges Faced and Drilled.	With Flanges Faced.				With Flanges Faced. and Drilled.	With Flanges Faced.
2	6	9.50	11.50	2 1/2	11.50	14.00	2	6	9.50	11.50	11.50	14.00	4	12	9	18.00	22.00
2 1/2	7	10.00	12.50	3	12.50	15.75	2 1/2	7	10.00	12.50	11.50	14.00	5	14	10	25.00	29.00
3	7 1/2	11.50	14.00	3 1/2	13.25	15.75	3	7 1/2	11.50	14.00	13.25	15.75	6	15	11	35.00	39.00
3 1/2	8 1/2	13.00	15.50	4	15.00	17.50	3 1/2	8 1/2	13.00	15.50	15.00	17.50	7	17	12 1/2	45.00	52.50
4	9	14.50	18.50	4 1/2	16.75	20.75	4	9	14.50	18.50	16.75	20.75	8	19	13 1/2	55.00	62.50
4 1/2	9 1/4	18.00	22.00	5	20.75	25.00	4 1/2	9 1/4	18.00	22.00	20.75	25.00	9	21 1/2	15	70.00	78.00
5	10	19.50	23.50	6	22.50	26.50	5	10	19.50	23.50	22.50	26.50	10	23	16	85.00	93.00
6	11	24.00	28.00	7	27.50	31.50	6	11	24.00	28.00	27.50	31.50	12	25 1/2	19	120.00	132.00
7	12 1/2	32.00	39.50	8	37.00	45.00	7	12 1/2	32.00	39.50	37.00	45.00	14	26 1/2	21	160.00	174.00
8	13 1/2	40.00	47.50	9	46.00	53.50	8	13 1/2	40.00	47.50	46.00	53.50	15	29	22 1/4	190.00	206.00
9	15	52.00	60.00	10	60.00	68.00	9	15	52.00	60.00	60.00	68.00	16	30 1/2	23 1/2	225.00	243.00
10	16	64.00	72.00	12	74.00	82.00	10	16	64.00	72.00	74.00	82.00	18	33	25	280.00	300.00
12	19	88.00	100.00	14	100.00	112.00	12	19	88.00	100.00	100.00	112.00					
14	21	116.00	130.00	16	132.00	146.00	14	21	116.00	130.00	132.00	146.00					
15	22 1/4	144.00	160.00	18	165.00	180.00	15	22 1/4	144.00	160.00	165.00	180.00					
16	23 1/2	168.00	186.00	20	193.00	210.00	16	23 1/2	168.00	186.00	193.00	210.00					
18	25	216.00	236.00	22	248.00	268.00	18	25	216.00	236.00	248.00	268.00					
20	27 1/2	270.00	296.00	24	310.00	335.00	20	27 1/2	270.00	296.00	310.00	335.00					
22	29 1/2	320.00	360.00	26	370.00	410.00	22	29 1/2	320.00	360.00	370.00	410.00					
24	31 1/2	400.00	440.00	28	460.00	500.00	24	31 1/2	400.00	440.00	460.00	500.00					

Flanged Fittings are furnished Faced only, unless otherwise ordered.

Dimensions of straight and reducing sizes are the same.

## EXTRA HEAVY FLANGED FITTINGS.

FOR 200 LBS. WORKING PRESSURE.

SIZE. Inches	CENTRE TO FACE. Inches	PRICE, ELBOWS.		SIZE. Inches	CENTRE TO FACE. Inches	DIAMETER OF FLANGES. Inches	PRICE, 45° ELBOWS.		SIZE. Inches	CENTRE TO FACE. Inches	FACE TO FACE. Inches	DIAMETER OF FLANGES. Inches	PRICE, TEES.		SIZE. Inches	PRICE, REDUCING TEES.	
		With Flanges Faced.	With Flanges Faced and Drilled.				With Flanges Faced.	With Flanges Faced and Drilled.					With Flanges Faced.	With Flanges Faced and Drilled.		With Flanges Faced.	With Flanges Faced and Drilled.
2	4 1/2	5.75	6.75	2	2 1/2	7	6.30	7.30	2	4 1/2	9	7	8.40	9.90	2	9.40	10.90
2 1/2	4 3/4	6.00	7.25	2 1/2	2 3/4	7 1/2	6.60	7.85	2 1/2	4 3/4	9 1/2	7 1/2	8.70	10.50	2 1/2	9.70	11.50
3	5 1/2	7.00	8.25	3	3	8 1/2	7.50	8.75	3	5 1/2	11	8 1/2	9.90	11.65	3	11.15	12.90
3 1/2	5 3/4	7.80	9.00	3 1/2	3 1/4	9	8.70	10.00	3 1/2	5 3/4	11 1/2	9	11.40	13.15	3 1/2	12.90	14.65
4	6	8.70	10.70	4	3 1/2	10	9.60	11.60	4	6	12	10	12.60	15.60	4	14.00	17.00
4 1/2	6 1/4	10.80	12.80	4 1/2	3 1/2	10 1/2	12.00	14.00	4 1/2	6 1/4	12 1/2	10 1/2	15.60	18.60	4 1/2	17.60	20.60
5	7	11.70	13.70	5	3 3/4	11	13.00	15.00	5	7	14	11	17.00	20.00	5	19.00	22.00
6	7 1/2	14.40	16.40	6	4 1/4	12	15.60	17.60	6	7 1/2	15	12	21.00	24.00	6	23.50	26.50
7	8 1/2	19.20	23.00	7	5 1/8	13 1/2	19.25	23.00	7	8 1/2	17	13 1/2	27.60	33.35	7	31.00	36.85
8	9 1/2	24.00	27.75	8	5 1/4	15	24.00	27.75	8	9 1/2	19	15	34.80	40.50	8	39.30	41.00
9	10 3/4	31.00	35.00	9	5 3/8	16	31.25	35.25	9	10 3/4	21 1/2	16	45.60	51.60	9	52.00	58.00
10	11 1/2	39.00	43.00	10	5 5/8	17 1/2	38.50	42.50	10	11 1/2	23	17 1/2	55.80	61.80	10	62.80	68.80
12	12 3/4	52.80	58.80	12	6 1/2	20	53.00	59.00	12	12 3/4	25 1/2	20	76.80	85.80	12	86.80	95.80
14	13 1/4	70.00	77.00	14	7 1/4	22	70.00	77.00	14	13 1/4	26 1/2	22	101.00	112.00	14	113.00	124.00
15	14 1/2	86.50	94.50	15	7 1/2	23	87.00	95.00	15	14 1/2	29	23	126.00	138.00	15	141.00	153.00
16	15 1/4	101.00	110.00	16	7 5/8	24	102.00	111.00	16	15 1/4	30 1/2	24	146.00	159.00	16	164.00	177.00
18	16 1/2	130.00	140.00	18	7 3/4	26	130.00	140.00	18	16 1/2	33	26	186.00	201.00	18	209.00	224.00
20	18	162.00	175.00	20	9	28	162.00	175.00	20	18	36	28	234.00	254.00	20	264.00	284.00
22	20	195.00	215.00	22	10	30	192.00	214.00	22	20	40	30	276.00	306.00	22	311.00	341.00
24	22	250.00	270.00	24	10 3/4	32	240.00	260.00	24	22	44	32	348.00	378.00	24	393.00	423.00

Flanged Fittings are furnished Faced only, unless otherwise ordered.

Dimensions of straight and reducing sizes are the same.

EXTRA HEAVY FLANGED FITTINGS.  
FOR 200 LBS. WORKING PRESSURE.

SIZE.	FACE TO FACE.	DIAMETER OF FLANGES.	PRICE, CROSS.		PRICE, REDUCING CROSS.		FACE TO FACE OF RUN.	PRICE, Y's.		PRICE, Y's. Reducing at Branch Only.	
			With Flanges Faced.	With Flanges Faced and Drilled	With Flanges Faced.	With Flanges Faced and Drilled.		With Flanges Faced.	With Flanges Faced and Drilled.	With Flanges Faced	With Flanges Faced and Drilled.
In.	Inches.	Inches.					In.				
2	9	7	11.40	13.40	13.00	15.00					
2 1/2	9 1/2	7 1/2	12.00	14.50	13.50	16.00					
3	11	8 1/2	13.80	16.30	15.50	18.00					
3 1/2	11 1/2	9	15.60	18.00	17.60	20.00					
4	12	10	17.40	21.40	19.60	23.60	12	17.40	21.40	19.60	23.60
4 1/2	12 1/2	10 1/2	21.60	25.60	24.40	28.40	12 1/2	21.60	25.60	24.40	28.40
5	14	11	23.40	27.40	26.40	30.40	14	23.40	27.40	26.40	30.40
6	15	12	28.80	32.80	32.30	36.30	15 1/2	28.80	32.80	32.30	36.30
7	17	13 1/2	38.40	46.00	43.40	51.00	18 1/4	38.40	46.00	43.40	51.00
8	19	15	48.00	55.50	54.00	61.50	19 3/4	48.00	55.50	54.00	61.50
9	21 1/2	16	62.40	70.40	70.00	78.00	22 1/2	62.40	70.40	70.00	78.00
10	23	17 1/2	77.00	85.00	86.80	95.00	24	77.00	85.00	86.80	95.00
12	25 1/2	20	105.00	117.00	117.00	129.00	27	105.00	117.00	117.00	129.00
14	26 1/2	22	140.00	154.00	156.00	170.00	28 1/2	140.00	154.00	156.00	170.00
15	29	23	172.00	188.00	193.00	209.00	31 1/4	173.00	188.00	193.00	209.00
16	30 1/2	24	202.00	220.00	227.00	245.00	32	202.00	220.00	227.00	245.00
18	33	26	259.00	279.00	291.00	311.00	35	259.00	279.00	291.00	311.00
20	36	28	324.00	350.00	364.00	390.00		324.00	350.00	364.00	390.00
22	40	30	384.00	424.00	434.00	474.00		384.00	424.00	434.00	474.00
24	44	32	480.00	520.00	540.00	580.00		480.00	520.00	540.00	580.00

EXTRA HEAVY FLANGES.  
FOR 200 LBS. WORKING PRESSURE.

PIPE SIZE.	OUTSIDE DIAM.	COMMON FLANGES.		TABLE FOR DRILLING.			SOLID FLANGES.	
		Faced. Each.	Faced and Drilled. Each.	Bolt Circle. Inches.	Number of Bolts.	Size of Bolts.	Faced. Each.	Faced and Drilled. Each.
Inches.	Inches.							
2	7	1.50	1.90	5 1/4	4	5/8 X 2 1/2	1.80	2.20
2 1/2	7 1/2	1.70	2.40	5 7/8	4	5/8 X 2 1/2	2.10	2.80
3	8 1/2	2.00	2.70	6 1/2	8	5/8 X 3	2.40	3.10
3 1/2	9	2.50	3.20	7	8	5/8 X 3	3.00	3.70
4	10	3.25	4.00	8	8	5/8 X 3 1/2	3.75	4.60
4 1/2	10 1/2	3.75	4.50	8 1/2	8	3/4 X 3 1/2	4.25	5.10
5	11	4.00	4.75	9	8	3/4 X 3 1/2	5.00	5.85
6	12	4.50	5.25	10	8	3/4 X 3 1/2	5.50	6.35
7	13 1/2	5.50	6.90	11 1/4	8	3/4 X 3 1/2	6.50	8.00
8	15	8.50	10.00	12 3/4	12	3/4 X 4	10.00	11.50
9	16	10.00	11.50	13 3/4	12	3/4 X 4	12.50	14.00
10	17 1/2	11.00	12.50	15 1/4	12	7/8 X 4 1/2	13.50	15.00
12	20	14.50	17.00	17 3/4	12	7/8 X 4 1/2	17.50	20.00
14	22	22.00	25.00	19 3/4	12	1 X 5	27.00	30.00
15	23	26.00	29.00	21	16	1 X 5	31.00	34.00
16	24	28.00	32.50	22	16	1 X 5	34.00	38.00
18	26	42.00	47.00	24	20	1 X 5	50.00	55.00
20	28	47.00	53.00	25 1/4	24	1 X 5	55.00	61.00
22	30	52.00	60.00	27 1/2	24	1 X 5	62.00	70.00
24	32	67.00	75.00	29 1/2	24	1 X 5	80.00	88.00

The above Flanges are furnished Faced only, unless otherwise ordered.

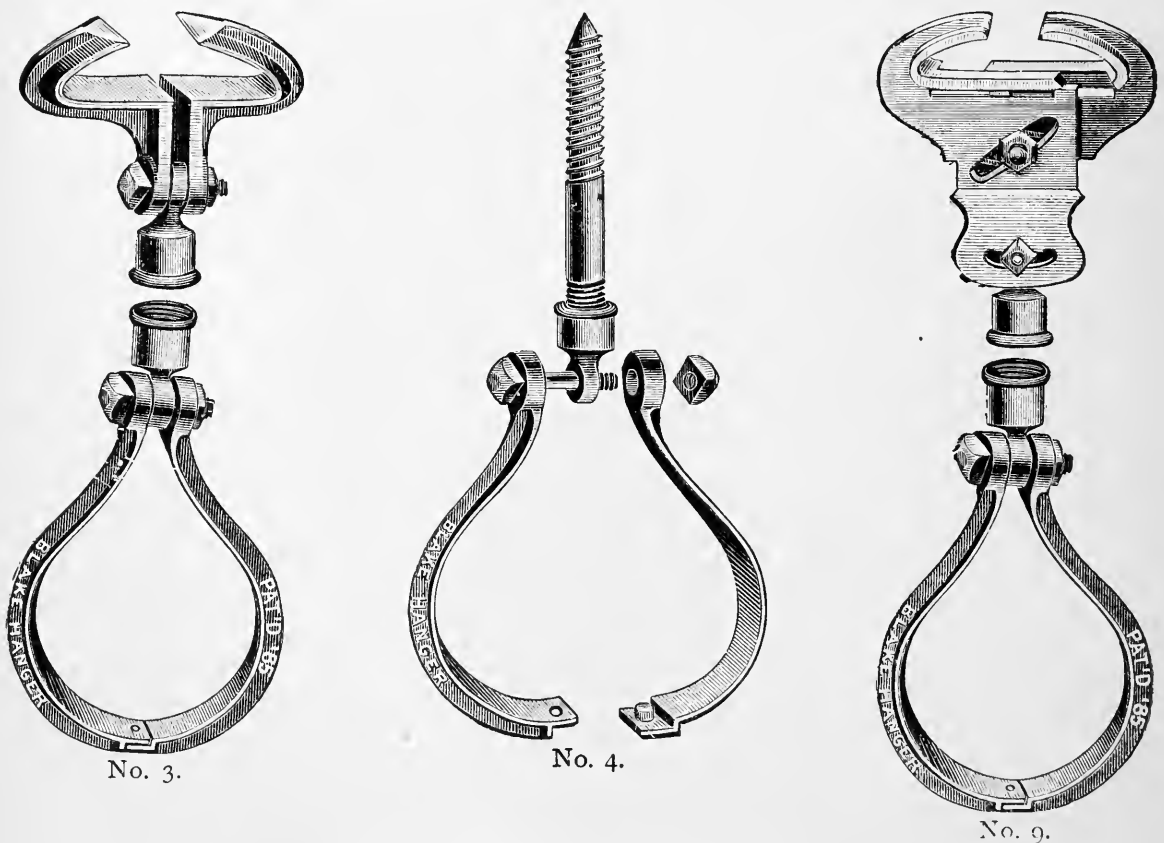
BLAKE'S PATENT MALLEABLE IRON PIPE  
HANGER,

WILLIAMS' PATENT ADJUSTABLE BEAM CLAMP.

THE BLAKE HANGER has no equal for simplicity, strength, and ease of adjustment. It can be attached to pipe when in position; it has no troublesome screws to adjust; it provides for expansion; it is adjustable to any desired pitch-lines of mains. It is the most economical and popular hanger in the market, and is endorsed and extensively used by the leading houses supplying the steam heating and plumbing trades throughout the United States.

THE B. & W. BEAM CLAMP. Figure 9 shows the Blake Hanger attached to a new and important improvement in Adjustable Beam Clamps. This clamp is made in three sizes,—No. 1, suitable for iron beams two to four inches; No. 2, for iron beams four to six inches; and No. 3, for iron beams six to eight inches. They are readily adjusted, and provide for an expansion movement in hanger attachment.

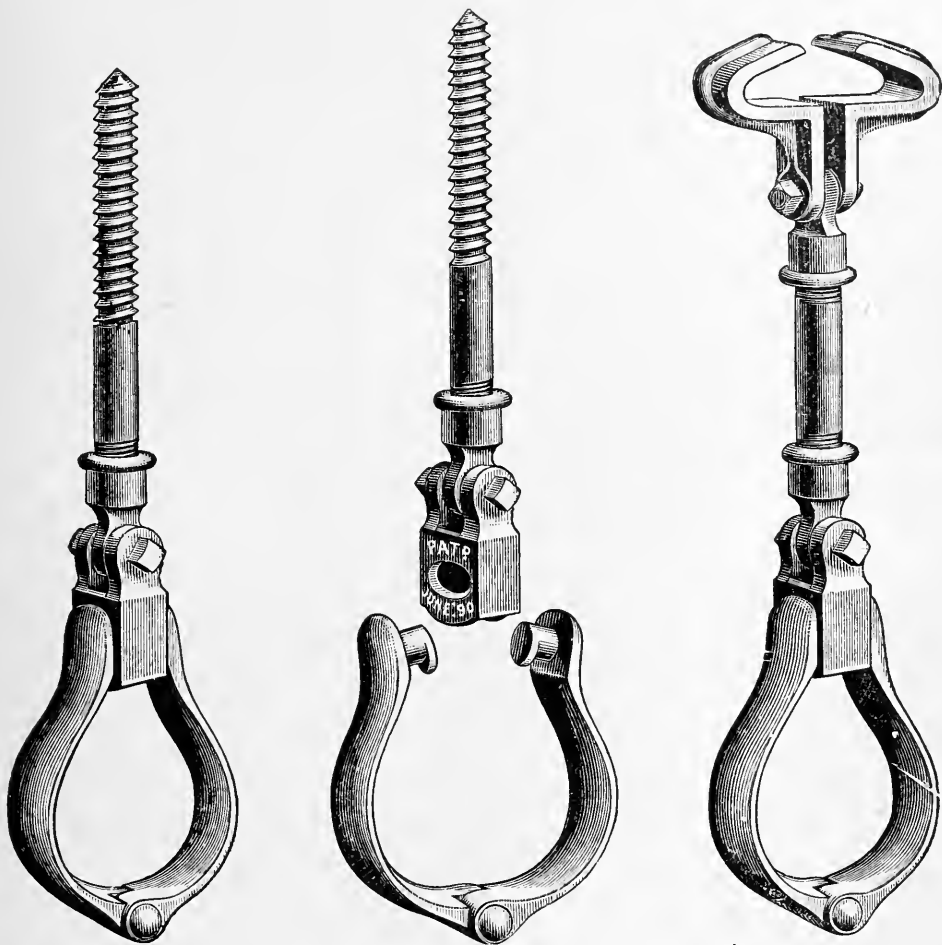
The combination of this clamp with the Blake Hanger is the most complete satisfactory, and practical device for the purpose ever placed on the market.



PRICE LIST AND SCHEDULE.

	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6	7	8	9	10	12	14
No. 4, complete----	15	15	18	18	20	22	25	30	35	50	60	70	90	1.20	1.40	1.60	1.80	2.20	2.50
No. 3, ".....	55	55	58	58	60	62	65	70	75	90	1.00	1.10	1.30	1.60	1.80	2.00	2.20	2.60	2.90
No. 9, ".....	65	65	68	68	70	72	75	80	85	1.00	1.10	1.20	1.40	1.70	1.90	2.10	2.30	2.70	3.00

UNIVERSAL PIPE HANGER.



No. 1.

PATENTED JUNE 24TH, 1890.

No. 2.

The "Universal" Hanger allows for expansion to the right and left, as well as forward and backward.

It is simple and easy of adjustment. Can be attached to pipe when in position.  
The lag screw may be extended to any length by means of iron pipe and coupling.

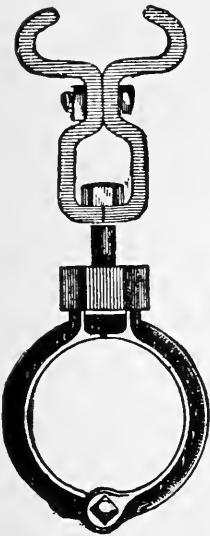
Size.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
No. 1.....	.18	.18	.20	.22	.25	.30	.35	.37
No. 2.....	.58	.58	.60	.62	.65	.70	.75	.77

Size.....	4	5	6	7	8	9	10	11	12	14
No. 1.....	.45	.55	.65	.85	.95	1.05	1.20	1.35	1.55	1.75
No. 2.....	.85	.95	1.05	1.25	1.35	1.45	1.60	1.75	1.95	2.15

In ordering No. 2 Hangers, state size of iron beam.



HOEY'S PATENT RING HANGERS.



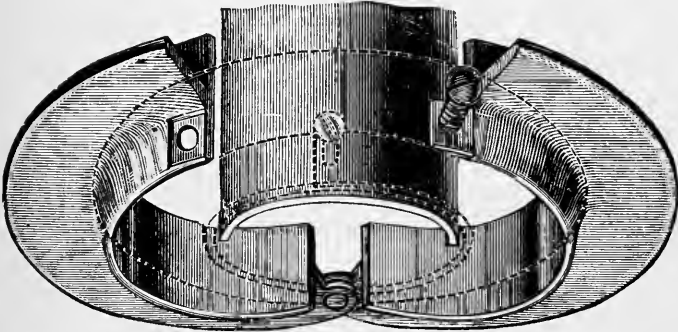
Cap.

Ring Hanger.

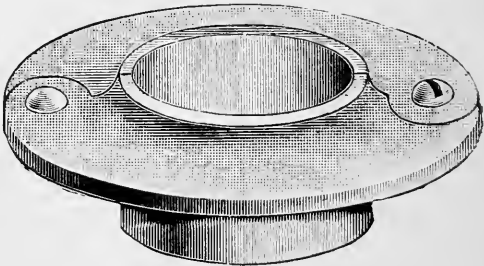
Size, inches,	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	7	8	10
Price, each, .	.18	.18	.20	.22	.25	.30	.35	.37	.45	.55	.75	.95	1.05	1.30

Adjustable Clamps for Iron Beams, 3, 3 1/4 and 3 1/2 inches, 35 cents each; 4 to 6 inches, 40 cents each  
The above prices include a Cap, and a Lag Screw from 6 to 12 inches long for each Hanger.

BEATON'S PATENT ADJUSTABLE CEILING  
AND FLOOR PLATES.



CEILING PLATE.

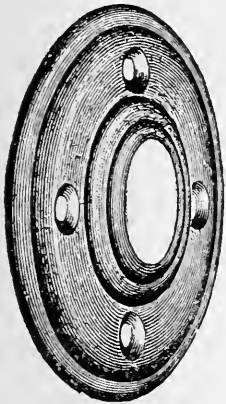


FLOOR PLATE.

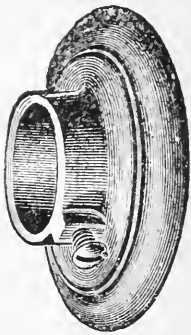
The cuts of the plates show their novel construction. The Floor Plate is shown closed, the Ceiling open, with dotted lines showing the same closed around the pipe. This operation is practical as the plates are made in halves and hinged together.  
The screws shown in the Ceiling Plate both holds the plate together and secures the plate at any position desired on the pipe. The set screw always holds the plate in place. A spring clasping a hot pipe will lose its temper and drop down.  
These are the only practical Plates made that can be put in after the work is finished, and can be secured in position. No arguments are necessary to convince any steam fitter of the practicability, desirability and utility of these plates. We will furnish them in Black Iron; also Nickel or Copper Plate.

Size,.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Floor and Ceiling Plate List, Black, .	.14	.14	.18	.20	.24	.28	.43	.60	.90	1.25	1.60	2 00
Floor and Ceiling Plate List, Nickel, .	.25	.25	.28	.32	.35	.38	.52	.75	1.10	1.50	2 00	2.50





NASON FLOOR AND CEILING  
PLATES.—CAST IRON.

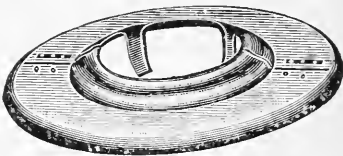
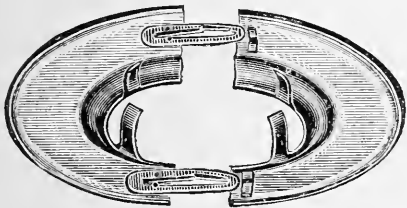


Sizes.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Floor Plates..... each	.06	.06	.08	.11	.14	.16
Ceiling Plates..... “	.11	.13	.16	.18	.23	.27

RUSSELL'S PATENT ADJUSTABLE FLOOR AND

CEILING PLATES.

COLD ROLLED STEEL.

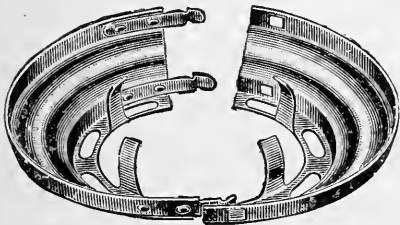


Sizes.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Polished Steel.....	.12	.12	.15	.18	.20	.24
Steel Nickel Plated.....	.25	.25	.28	.32	.35	.38

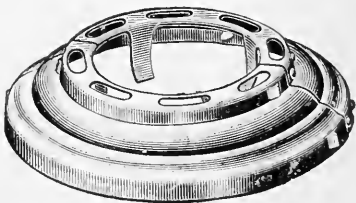
RUSSELL'S PATENT ADJUSTABLE FLOOR AND

CEILING PLATES.

SPRING BRASS NICKEL  
PLATED.

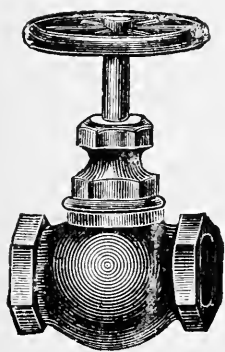


Easily adjusted to the pipe  
and will stay in position.  
Will hold the nickel finish and  
always look well. Handsome  
in design and heavy in weight  
and finish.

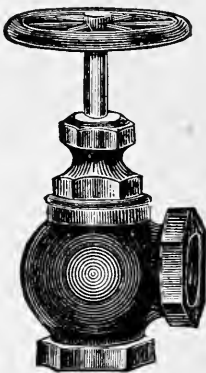


Sizes.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Nickel-Brass.....	.25	.25	.25	.28	.32	.35	.38	.52	.75

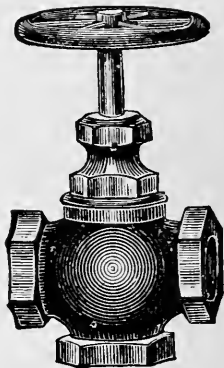
STANDARD BRASS VALVES.



Globe Valve.

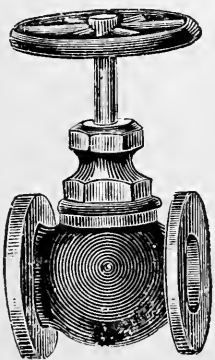


Angle Valve.



Cross Valve.

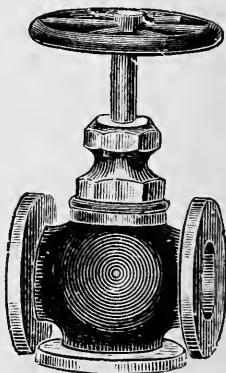
Size .....	1⁄8	1⁄4	3⁄8	1⁄2	3⁄4	1	1 1⁄4
Globe and Angle Valves, Screwed....	.72	.72	.77	1.00	1.26	1.80	2.52
Cross Valves, Screwed.....	---	1.25	1.25	1.50	2.00	2.50	3.50
Size .....	1 1⁄2	2	2 1⁄2	3	3 1⁄2	4	
Globe and Angle Valves, Screwed....	3.50	5.30	10.00	14.40	26.50	36.00	
Cross Valves, Screwed.....	5.00	8.00	16.00	24.00	45.00	60.00	



Flanged Globe Valve.



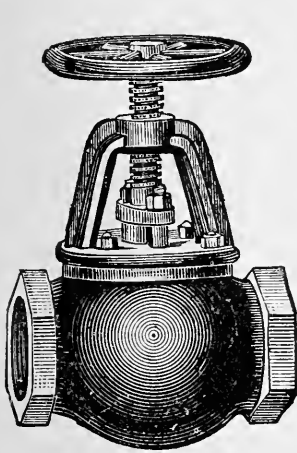
Flanged Angle Valve.



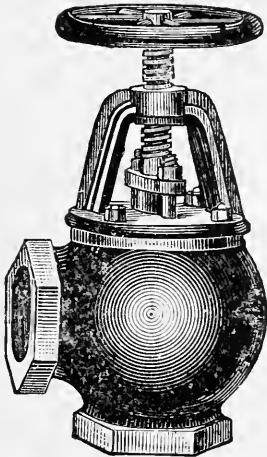
Flanged Cross Valve.

Size .....	1 1⁄2	3⁄4	1	1 1⁄4	1 1⁄2	2
Globe and Angle Valves, Flanged....	4.50	5.00	6.75	8.50	10.50	16.00
Cross Valves, Flanged.....	5.25	7.00	9.00	12.00	15.75	22.00
Size .....	2 1⁄2	3	3 1⁄2	4	5	6
Globe and Angle Valves, Flanged....	23.00	35.00	50.00	70.00	125.00	200.00
Cross Valves, Flanged.....	33.00	45.00	75.00	100.00		

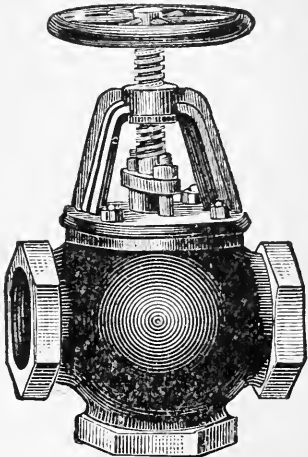
STANDARD IRON BODY VALVES, BRASS MOUNTED.



Globe Valve with Yoke.



Angle Valve with Yoke.

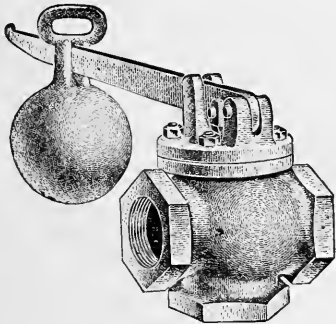


Cross Valve with Yoke.

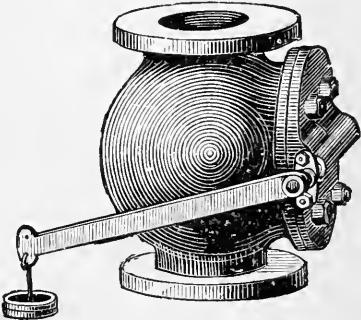
With Yoke.													
Size.....	2	2½	3	3½	4	4½	5	6	7	8	10	12	14 16
Yoke Globe and Angle													
Valves, Screwed....	7.00	9.00	12.50	15.25	19.00	24.00	27.00	37.50	63.00	72.00	114.00	170.00	.. ..
Yoke Globe and Angle													
Valves, Flanged....	8.60	10.75	15.00	18.50	22.50	27.50	31.00	42.00	68.00	77.00	123.00	187.00	350.00 475.00
Yoke Cross Valves, Scr..	8.50	11.75	16.25	20.00	23.50	30.65	35.25	47.25	78.00	92.00	162.00	240.00	.. ..
Yoke Cross Valves, Fl..	11.00	14.50	20.00	25.00	28.50	36.00	41.00	54.00	85.00	100.00	175.00	265.00	.. ..

Without Yoke.					
Size .....	1	1¼	1½	2	2½ 3
Globe and Angle Valves, Screwed.....	2.25	2.75	3.50	5.40	7.35 9.80
Cross Valves, Screwed.....	---	---	---	6.50	9.00 12.50
Globe and Angle Valves, Flanged.....	3.25	3.85	4.80	7.00	9.00 12.50
Cross Valves, Flanged.....	---	---	---	9.00	11.75 16.50

SAFETY AND BACK PRESSURE VALVES.



Safety Valve.



Back Pressure Valve.

Size.....	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Safety Valves, Screwed.....	3.50	4.00	5.00	5.80	7.80	13.25	17.25	23.00	28.75	34.50	41.50	57.75	93.50	132.00
Safety Valves, Flanged.....	..	5.50	6.75	7.75	10.25	16.00	21.50	27.50	34.00	40.00	48.00	65.00	100.00	140.00
Angle Safety Valves, Screwed	3.50	4.00	5.00	5.80	7.80	13.25	17.25	23.00	28.75	34.50	41.50	57.75	93.50	132.00
Angle Safety Valves, Flanged..	..	5.50	6.75	7.75	10.25	16.00	21.50	27.50	34.00	40.00	48.00	65.00	100.00	140.00

BACK PRESSURE VALVE.

Sizes.....	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12	14 16
Back Pressure Valves, Scr.	9.00	11.00	13.00	15.00	19.00	22.50	28.50	33.50	43.00	70.00	85.00	120.00	180.00	..
Back Pressure Valves, Fl..	10.50	12.75	15.00	17.50	22.00	26.00	32.00	37.00	47.00	75.00	90.00	130.00	200.00	350.00 475.00

RENEWABLE VULCANIZED ASBESTOS DISC,  
GLOBE AND ANGLE VALVES.

BRASS.

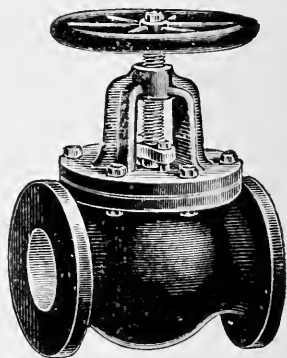
Size, ins.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Price....	\$1.10	1.10	1.25	1.60	2.20	2.80
Size ins..	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	----
Price....	4.00	5.50	8.75	15.75	22.00	----

IRON BODY.

Size, ins..	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$
Screwed..	\$10.00	12.00	16.75	19.50	24.00	22.00
Flanged..	11.75	14.00	18.50	21.50	26.00	34.00
Size, ins..	5	6	7	8	10	12
Screwed..	40.00	48.00	80.00	90.00	130.00	185.00
Flanged..	42.00	50.00	80.00	90.00	130.00	185.00



Brass A. D. Globe.

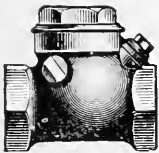


Iron Body A. D. Globe.

STRAIGHTWAY SWINGING  
CHECK VALVES.

BRASS.

Size, inches....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Price.....	\$1.25	1.25	1.30	1.75	2.25
Size, inches....	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Price.....	3.25	4.25	6.25	11.50	16.00



Brass Hor. Check.



Iron Body Hor. Check.

IRON BODY.

Size, inches..	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5
Screwed or Flanged ..	\$6.25 10.00 12.00 16.00 18.00 25.00					
Size, inches..	6	7	8			
Screwed or Flanged ..	32.00 41.00 50.00					



Brass Angle Check.



Brass A. S. Gate.

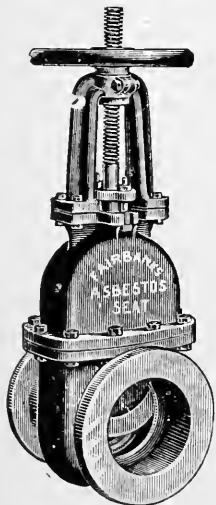
RENEWABLE VULCANIZED  
ASBESTOS SEAT, GATE  
VALVES

BRASS.

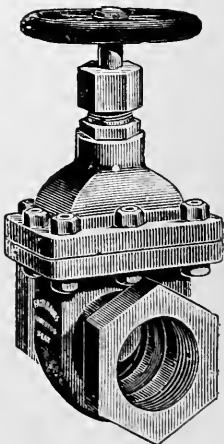
Size, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Price .....	\$1.50	1.65	2.20	2.80	4.00
Size, inches.....	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Price.....	5.30	7.80	17.00	23.00	45.00

IRON BODY.

Size, inches.....	2	$2\frac{1}{2}$	3		
Screwed or { Stat'y Spindle..	\$7.50	10.75	14.00		
Flanged... { Rising Spindle..	----	22.75	26.00		
Size, inches.....	$3\frac{1}{2}$	4	$4\frac{1}{2}$		
Screwed or { Stat'y Spindle..	\$18.25	20.50	25.00		
Flanged... { Rising Spindle..	31.75	36.50	44.00		



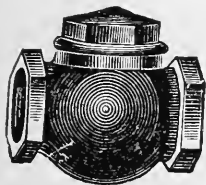
Iron Body Gate, with  
Rising Spindle.



I. B. A. S. Gate,  
Stationary Spindle.

Size, inches.....	5	6	7	8	10	12
Screwed or { Stationary Spindle.....	\$27.00	34.00	41.00	51.50	73.00	100.00
Flanged... { Rising Spindle.....	51.00	61.00	71.00	91.00	124.00	154.00

BRASS CHECK VALVES.



Horizontal Check Valve, screwed.



Vertical Check Valve, screwed.

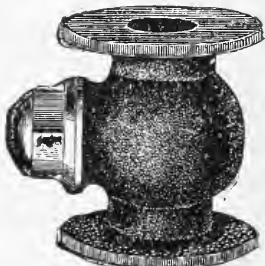


Angle Check Valve, screwed.

Size .....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Hor. Check Valves, Scr....	.65	.65	.70	.90	1.15	1.60	2.25	3.15	4.75	9.00	13.00	24.00	32.50
Vert. Check Valves, Scr....		.72	.77	1.00	1.26	1.80	2.52	3.50	5.30	10.00	14.40	26.50	36.00
Vert. Check Valves, } Scr. (Cap on Side) }	----	--	--	--	1.85	2.50	3.25	4.15	5.00	7.25	18.00	25.00	----
Angle Check Valves, Scr---	.72	.72	.77	1.00	1.26	1.80	2.52	3.50	5.30	10.00	14.40	26.50	36.00



Horizontal Check Valve, flanged.



Vertical Check Valve, flanged.

Size .....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Hor. Ck. Valves, Fl....	4.40	4.90	6.50	8.25	10.15	15.50	22.00	33.50	47.50	66.50	--	--
Vert. Ck. Valves, Fl....	4.50	5.00	6.75	8.50	10.50	16.00	23.00	35.00	50.00	70.00	125.00	200.00
Angle Ck. Valves, Fl..	4.50	5.00	6.75	8.50	10.50	16.00	23.00	35.00	50.00	70.00	125.00	200.00

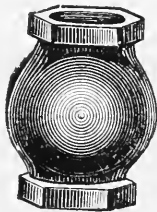
IRON BODY CHECK VALVE.



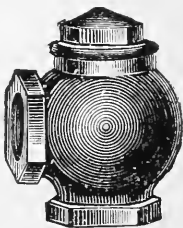
Horizontal Check Valve, screwed.



Horizontal Check Valve, flanged.



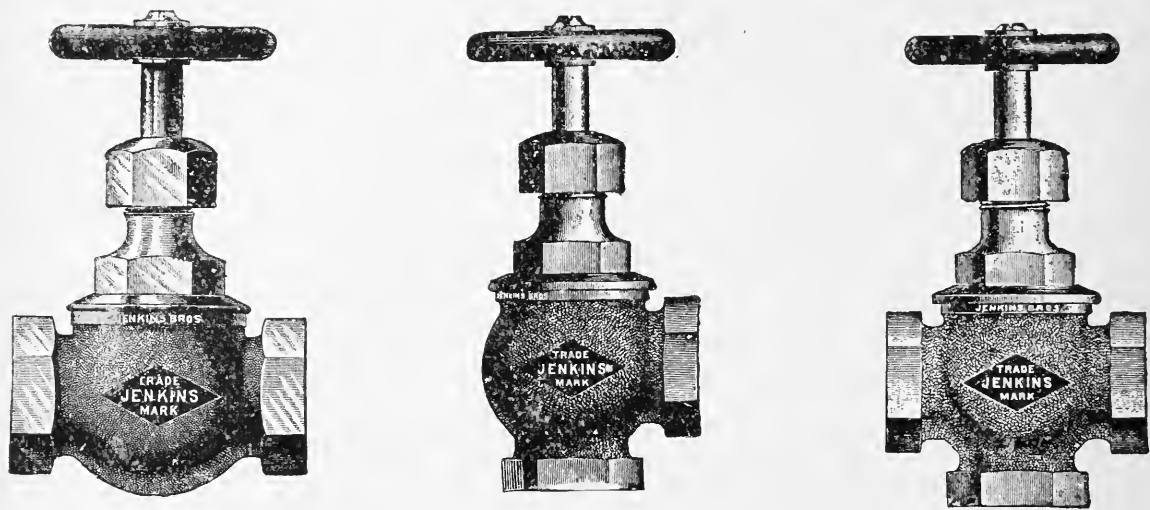
Vertical Check Valve, screwed.



Angle Check Valve, screwed.

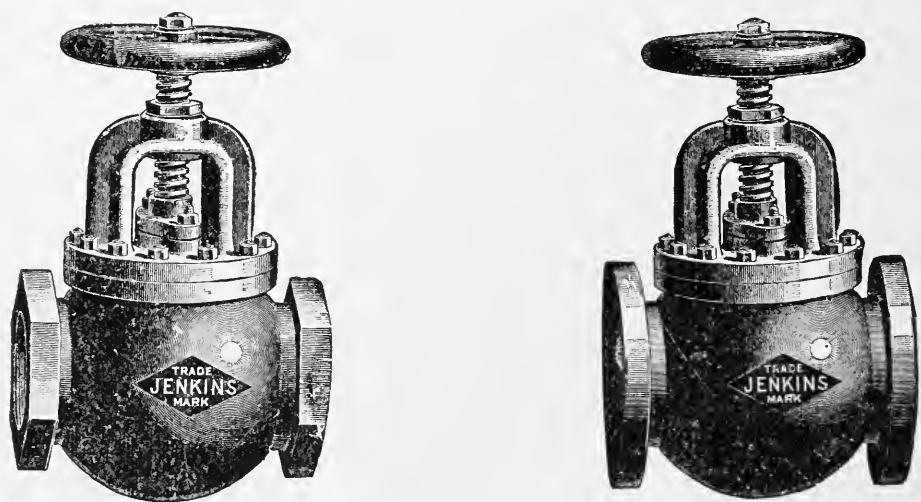
Size .....	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	10	12	14	16
Hor. Ck. V'l's, Scr.	1.50	2.20	2.65	3.60	6.50	8.90	12.25	14.25	19.00	22.00	30.00	45.00	57.00	105.00	155.00	....	....
Hor. Ck. V'l's, Fl.	2.50	3.25	4.00	5.25	8.25	11.50	15.50	18.00	22.50	26.00	35.00	50.00	62.00	115.00	175.00	300.00	425.00
Vert. Ck. V'l's, Scr.	..	..	..	7.00	9.50	12.50	17.00	21.00	30.00	33.00	40.00	62.00	73.00	....	....	....	....
Vert. Ck. V'l's, Fl..	..	..	..	8.75	11.50	15.00	20.00	25.00	33.50	37.00	45.00	67.00	78.00	...	...	...	...
Ang Ck. V'l's, Scr	1.50	2.20	2.65	3.60	6.50	8.90	12.25	14.25	19.00	22.00	30.00	45.00	57.00	105.00	155.00	....	....
Ang Ck. V'l's, Fl.	2.50	3.25	4.00	5.25	8.25	11.50	15.50	18.00	22.50	26.00	35.00	50.00	62.00	115.00	175.00	...	...

JENKINS BROS. VALVES.



GLOBE, ANGLE, AND CROSS VALVES.

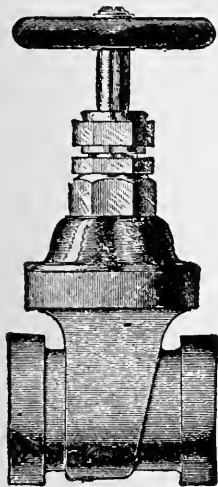
Size .....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Brass Globe and Angle Valves, scr.	1.10	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.75	15.75	22.00
"    "    "    fl'd.	--	--	--	--	--	6.00	9.00	11.00	16.50	25.00	34.00
Brass Cross Valves, screwed	--	1.70	2.00	2.25	2.50	3.25	4.75	6.25	9.50	20.00	27.50
"    "    flanged	--	--	--	--	--	8.64	11.45	15.10	22.70	32.82	44.30
Brass Hose End Globe and Angle Valves	--	--	--	--	--	3.30	4.70	6.50	9.15	17.10	23.35



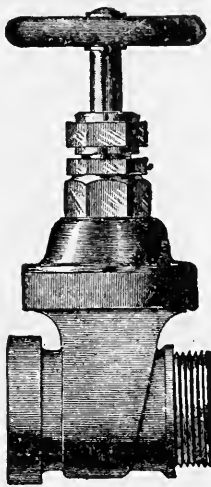
IRON BODY, COMPOSITION MOUNTED.

Size .....	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	10	12
GLOBE AND ANGLE VALVES																
Brass Hub, screwed	2.75	2.85	3.85	5.00	7.25	11.00	16.00	--	--	--	--	--	--	--	--	--
"    flanged	--	--	--	--	8.50	13.00	18.00	--	--	--	--	--	--	--	--	--
With Yoke, screwed	--	--	--	--	10.00	12.00	16.75	19.50	24.00	32.00	40.00	48.00	80.00	90.00	130.00	185.00
"    flanged	--	--	--	--	11.75	14.00	18.50	21.50	26.00	34.00	42.00	50.00	80.00	90.00	130.00	185.00
Cross Valves, screwed	--	--	--	--	--	16.00	21.00	26.00	30.00	42.00	45.00	58.00	--	--	--	--
"    flanged	--	--	--	--	--	19.00	24.00	29.00	33.00	45.00	48.00	62.00	--	--	--	--
Diameter of Flanges	--	--	--	--	6	7	7 1/2	8 1/2	9	9 1/4	10	11	12 1/2	13 1/2	16	19
Size .....									14	16	18	20	24			
Globe and Angle Valves, with Yoke, flanged									334.00	400.00	511.00	578.00	1222.00			
Diameter of Flanges									21	23 1/2	25	27 1/2	32			

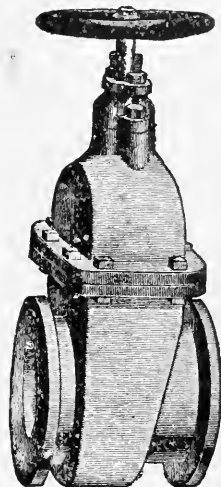
JENKINS BROS. VALVES.—Continued.



Brass Gate Valve, Stationary  
Spindle, Screwed.



Brass Hose Gate Valve.



Iron Body Gate, Composition  
Mounted, Flanged.

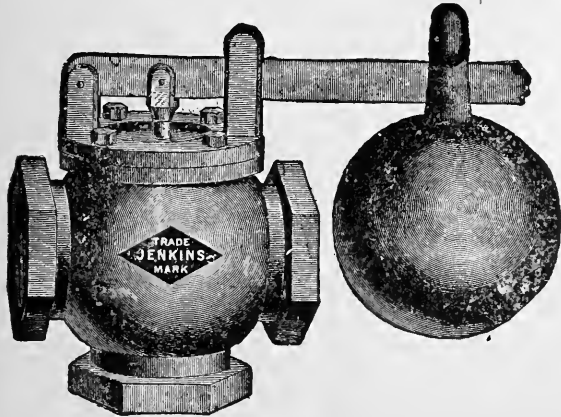
JENKINS GATE VALVES.

Size.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Brass Gate Valves, screwed .....	2.00	2.50	3 25	4.25	5.25	7.50	14.00	20.00
“ “ “ flanged .....	3.50	4.50	6.00	7.50	10.00	14.00	21.00	28.00
Brass Hose Gate Valves .....	..	..	3.70	4.95	6.15	8.75	15.75	22.00
Hose Caps, rough, without chain or swivel..	--	.60	.75	1.15	1.50	2.00	2.50	--
“ “ finished, with chain .....	--	1.00	1.25	1.75	2.25	3.00	3.50	--

IRON BODY, COMPOSITION MOUNTED.

Size.....	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	10	12
Gate Valves, screwed.....	8.00	12 00	15.00	18.00	21.00	29.00	30.00	36.00	50.00	62.00	85 00	120.00
“ “ flanged .....	9.00	13.00	16.00	19.00	22.50	31.00	32.00	38 00	50.00	62.00	85.00	120.00
Hub or Spigot Gate Valves .....	9 00	12.00	15.00	18.00	21 00	29.00	30.00	36.00	50.00	62 00	85.00	120.00
Diam. of flanges—Gate Valves..	6	7	7 1/2	8 1/2	9	9 1/4	10	11	12 1/2	13 1/2	16	19
Face to face—Gate Val., sc. & fl.	6	7 1/4	7 3/8	7 7/8	8 3/8	8 7/8	9 1/2	10	11	12 1/4	14 1/4	14 3/8

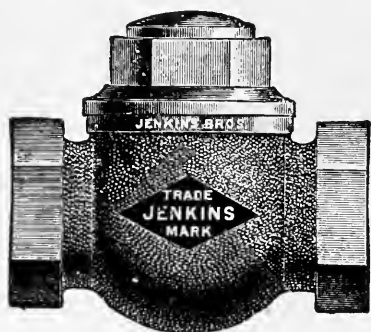
JENKINS SAFETY VALVE.



Size.....	1/2	3/4	1	1 1/4	1 1/2	2		
Brass sc. ....	4.12	4.95	5.50	8.25	10.15	15.40		
Size.....	3/4	1	1 1/4	1 1/2	2	2 1/2		
Iron Body sc. ....	4.25	4.50	6.25	7.25	10.25	16.75		
Size.....	3	3 1/2	4	4 1/2	5	6		
Iron Body sc. ....	22.00	31.00	38.00	46.50	55.00	73.00		
Size.....	--	--	2	2 1/2	3	3 1/2		
Iron Body fl. ....	--	--	12.25	19.00	25.50	34.00		
Size.....	--	--	4	4 1/2	5	6		
Iron Body fl. ....	--	--	41.50	51.75	62.00	80.00		
Size.....	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Diam. of fl. ....	6	7	7 1/2	8 1/2	9	9 1/4	10	11

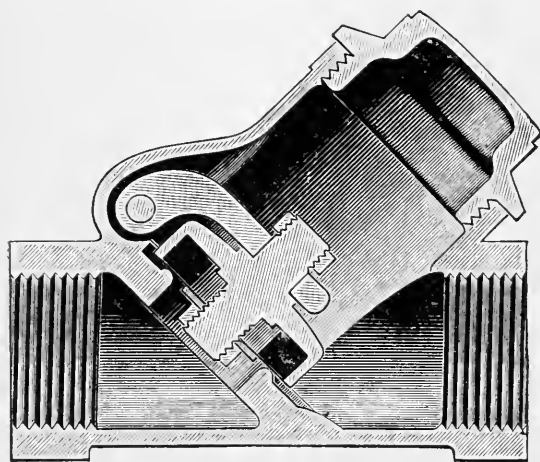


## JENKINS BROS. VALVES.—Continued.

Horizontal Brass Check Valve,  
Screwed.Horizontal I. B. Check Valve,  
Flanged.

Size.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Brass, Horizontal, Angle, and Vertical, screwed.....	1.10	1.20	1.30	1.90	2.60	3.60	5.00	7.50	13.50	20.50
Brass, Horizontal, Angle, and Vertical, flanged.....	---	---	---	4.75	5.50	7.80	9.80	15.00	22.80	32.40

Size.....	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Iron Body Check, screwed, horizontal, angle, and vertical.....	10.50	14.00	17.00	20.00	30.00	40.00
“ “ flanged, “ “ “.....	12.50	16.50	20.00	23.00	33.00	43.00
Diameter of Flanges.....	7	$7\frac{1}{2}$	$8\frac{1}{2}$	9	10	11



## JENKINS' SWING CHECK.

**Simplicity.**—It can be repaired by simply removing cap and renewing the disc.

**Durability.**—As it is not metal against metal, there is no chance for the seat to wear—the only wear being on the Jenkins Disc.

**Economy.**—It has been demonstrated that the average life of a Jenkins Disc in use in Check Valves is from eight to ten years; consequently, the saving in disconnecting and regrinding the valves alone makes it the most economical.

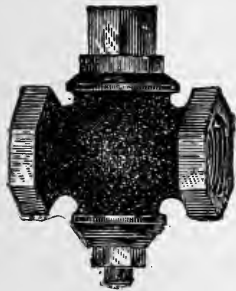
Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Brass, screwed.....	1.30	1.90	2.60	3.60	5.00	7.50	13.50	20.50	---	---	---	---
“ flanged.....	---	---	5.50	7.80	9.80	15.00	22.80	32.40	---	---	---	---
Iron Body, screwed.....	---	---	---	---	---	12.00	15.50	18.50	22.75	32.90	43.75	---
“ “ flanged.....	---	---	---	---	---	13.90	17.75	20.60	25.45	36.10	47.10	---
Diameter of Flanges.....	---	---	---	---	---	6	7	$7\frac{1}{2}$	$8\frac{1}{2}$	9	10	11

## JENKINS DISCS.

Size.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	10	12
Each.....	.03	.04	.04	.05	.06	.09	.12	.18	.24	.33	.45	.52	.60	.68	.90	.98	1.20	1.75	2.25



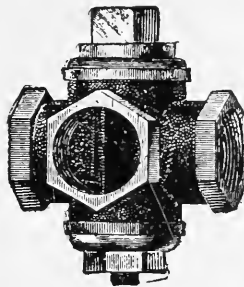
BRASS STEAM AND GAS COCKS.



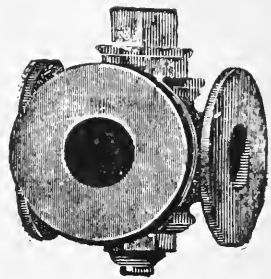
Screwed.



Flanged.



3-Way Screwed.



3-Way Flanged.

BRASS STEAM COCKS.

Size.....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Screwed .....	.85	.85	1.00	1.25	1.70	2.35	3.70	4.85	7.30	14.50	22.50	38.50	50.00	..	..
Flanged .....	..	..	..	4.75	5.50	7.30	9.70	11.75	18.00	27.50	43.00	62.00	84.00	150.00	275.00
3-Way Screwed.....	..	..	..	2.50	3.00	3.75	5.75	7.15	11.00	18.75	26.00	50.00	70.00	..	..
3-Way Flanged.....	..	..	..	7.75	8.75	11.25	14.75	17.75	27.00	38.25	57.00	85.00	121.00	..	..

BRASS STEAM COCKS, EXTRA HEAVY.

Size.....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Screwed.....	1.30	1.50	1.50	2.00	2.85	4.00	6.75	8.50	13.50	25.00	37.00	54.00	75.00
Flanged.....	..	..	..	6.50	7.75	10.00	14.25	17.25	27.00	41.00	63.00	84.00	120.00

GAS SERVICE COCKS.



Square Head.



Flat Head.

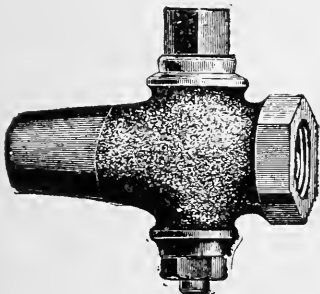


T-Handle.



Male and Female.

Size.....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Gas Service Cocks, Square Head.	.75	.75	.85	.95	1.15	1.50	2.25	3.10	5.00	11.00	16.00
“ “ “ Flat Head.....	.75	.75	.85	.95	1.15	1.50	2.25	3.10	5.00	11.00	16.00
“ “ “ Tee Handle.....	.75	.75	.85	.95	1.15	1.50	2.25	3.10	5.00	11.00	16.00
Gas Cocks, Male and Female.....	..	1.00	1.00	1.30	1.40	1.95	3.00	4.25	6.00	..	..



Square Head.

METER AND UNION METER COCKS.

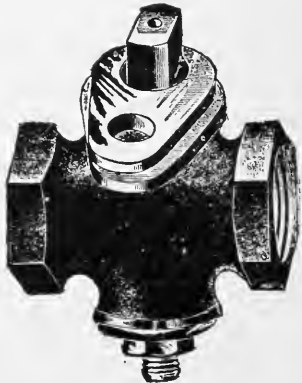
Size....	1/2	3/4	1	1 1/4	1 1/2	2
Price...	1.30	1.40	1.95	3.00	4.25	6.00

UNION METER COCKS.

Size....	1/2	3/4	1	1 1/4	1 1/2	2
Price...	1.40	1.55	2.20	3.40	5.00	7.00

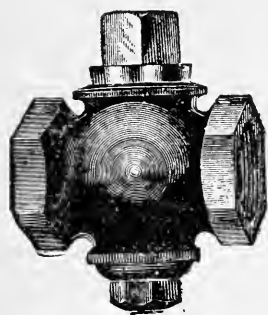
LOCK GAS SERVICE AND METER COCKS.

Size .....	1/2	3/4	1	1 1/4	1 1/2	2
Lock Gas Service Cocks.....	1.30	1.60	2.10	3.50	5.00	7.00
Lock Gas Meter Cocks.....	1.40	1.75	2.30	3.85	5.50	7.75
Lock Gas Union Meter Cocks.	1.50	1.80	2.50	4.00	5.50	8.00

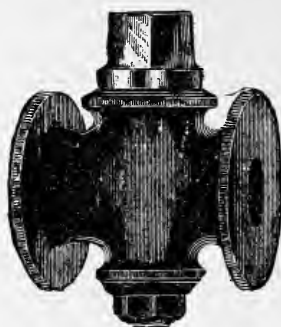


Lock Service.

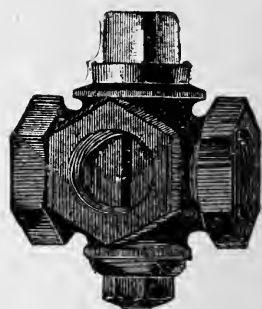
## IRON COCKS.



SCREWED.



FLANGED.



3-WAY SCREWED.

## ALL IRON COCKS.

Size .....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screwed .....	.85	.90	1.05	1.30	1.60	1.95	2.70	4.40	6.75	12.00	15.50	32.00	45.00
Flanged .....	--	--	--	2.25	2.75	3.25	4.25	6.25	9.50	15.00	19.00	36.00	50.00
3-Way Screwed .....	--	--	--	1.65	1.80	2.05	2.65	3.65	5.35	7.50	14.00	19.00	36.50
3-Way Flanged .....	--	--	--	--	3.75	4.25	5.25	7.00	9.00	12.75	20.00	26.00	44.00

## IRON COCKS WITH BRASS PLUGS.

Size .....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screwed .....	1.25	1.30	1.60	1.90	2.65	3.75	5.25	8.75	13.00	27.50	36.50	67.00	94.00
Flanged .....	--	--	--	3.00	3.75	5.00	7.00	10.50	15.75	30.00	40.00	70.00	100.00
3-Way Screwed .....	--	--	2.20	2.40	3.10	4.50	6.25	9.75	13.75	30.00	40.00	71.50	100.00
3-Way Flanged .....	--	--	--	4.50	5.25	7.00	9.50	13.25	19.00	36.00	47.00	80.00	108.00

## IRON COCKS WITH BRASS WASHERS.

Size .....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screwed .....	--	1.00	1.20	1.55	1.95	2.35	3.20	5.15	7.75	14.00	19.00	38.00	53.00
Flanged .....	--	--	--	2.50	3.10	3.65	4.75	7.00	10.50	17.00	22.50	42.00	58.00
3-Way Screwed .....	--	--	1.80	2.05	2.40	3.05	4.15	6.10	8.50	16.00	22.50	42.50	60.00
3-Way Flanged .....	--	--	--	4.00	4.60	5.65	7.50	9.75	13.75	22.00	29.50	50.00	68.00

## IRON COCKS WITH BRASS PLUGS AND WASHERS.

Size .....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screwed .....	--	1.40	1.75	2.15	3.00	4.15	5.75	9.50	14.00	29.50	40.00	73.00	102.00
Flanged .....	--	--	--	3.25	4.10	5.40	7.50	11.25	16.75	32.00	43.50	76.00	108.00
3-Way Screwed .....	--	--	2.35	2.65	3.45	4.90	6.75	10.50	14.75	32.00	43.50	77.50	108.00
3-Way Flanged .....	--	--	--	4.75	5.60	7.40	10.00	14.00	20.00	38.00	50.50	86.00	116.00

## EXTRA HEAVY IRON COCKS.

## ALL IRON COCKS.

Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screwed .....	1.15	1.25	1.75	2.10	2.80	3.65	6.50	9.00	16.75	22.50	45.00	62.00
3-Way Screwed .....	--	1.80	2.50	2.80	3.90	5.60	8.40	12.00	21.00	28.00	56.00	77.00

## IRON COCKS WITH BRASS PLUG.

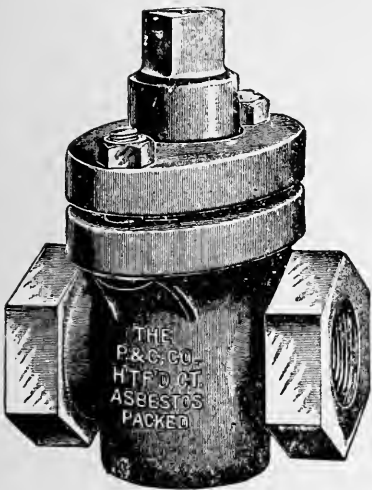
Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screwed .....	1.70	2.25	2.80	3.85	5.60	7.00	13.25	19.00	42.00	56.00	98.00	133.00
3-Way Screwed .....	--	2.80	3.50	4.50	6.75	9.25	15.50	22.00	46.00	62.00	107.00	146.00

## IRON COCKS WITH BRASS WASHERS.

Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screwed .....	1.25	1.40	2.00	2.45	3.20	4.15	7.25	10.00	18.75	26.00	51.00	70.00
3-Way Screwed .....	--	1.95	2.75	3.15	4.30	6.10	9.15	13.00	23.00	31.50	62.00	85.00

## IRON COCKS WITH BRASS PLUG AND WASHER.

Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screwed .....	1.80	2.40	3.05	4.20	6.00	7.50	14.00	20.00	44.00	59.50	104.00	141.00
3-Way Screwed .....	--	2.95	3.75	4.85	7.15	9.75	16.25	23.00	48.00	65.50	113.00	154.00



ASBESTOS  
PACKED COCKS.

IRON AND BRASS.

For Steam, Oil, Gas, Air,  
Ammonia, Etc.

ALL IRON.  
BARFFED PLUGS.



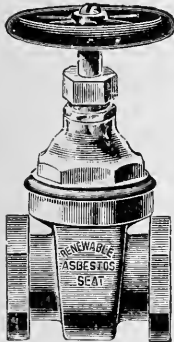
Section of Asbestos Packed Cock  
Barrel.  
  
Showing Grooves Containing Asbestos  
Packing.

Size .....	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Price.....	1.30	1.45	1.60	2.10	2.50	3.50	4.75	7.00	12.00	18.00	27.00	30.00	45.00	60.00

BRASS OR STEAM METAL, FROM SAME PATTERNS AS IRON.

Size .....	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	-----	-----
Price .....	3.35	3.35	3.35	4.20	5.60	8.00	10.35	16.00	26.50	37.50	50.50	64.00	-----	-----

VULCANIZED ASBESTOS SEAT ALL-IRON  
AMMONIA GATE VALVES.



Screw Ends,  
Counterbored.

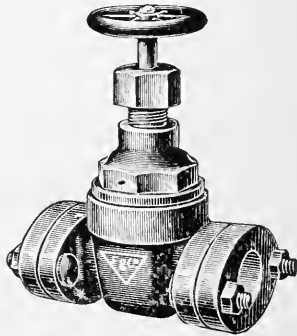
WITH SCREWED ENDS COUNTERBORED,  
OR GLAND ENDS.

Size, inches.	1/2	3/4	1	1 1/4	1 1/2
Screwed....	3.00	3.60	4.20	5.10	6.00
Gland end..	4.00	4.80	5.55	6.60	7.65

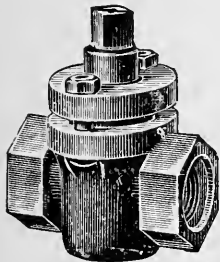
Size, inches.	2	2 1/2	3	3 1/2	4
Screwed....	8.50	12.00	14.50	-----	-----
Gland end..	10.45	16.20	20.50	-----	-----

Sizes 2 in. and over are made with bolted bonnet.



Gland Ends.

VULCANIZED ASBESTOS PACKED IRON  
AMMONIA COCKS.



Counterbored.

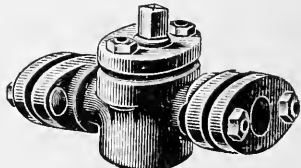
Size, in. . .	1/4	3/8	1/2	3/4	1	1 1/4
Screwed..	1.40	1.50	1.60	2.10	2.50	3.50
Gland end	2.10	2.25	2.45	3.10	3.65	4.75

Size, in. . .	1 1/2	2	2 1/2	3	3 1/2	4
Screwed..	4.75	7.00	12.00	18.00	27.00	30.00
Gland end	6.10	8.65	15.50	23.00	-----	-----

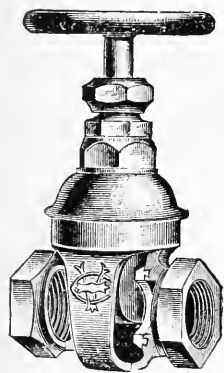
When ordering, state what pressure cocks will  
be required to stand.

The specially prepared Asbestos Packing in these cocks, when worn, may be renewed.  
Price for repairing furnished on application.



Gland End.

CHAPMAN GATE VALVES.



Composition  
Screwed.



Iron Body, Flanged,  
With Bolted Top.

COMPOSITION STEAM AND WATER VALVES.

WITH BRASS OR BABBITT METAL SEATS.

Size, inches.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Face to Face, Screw Ends.....	2⅜	2⅜	2¾	2¾	3⅜	3⅜	4⅜	4¾	5⅞	6¾	8⅜	8⅞
Face to Face, Flange Ends.....	2½	2½	2⅞	3	3⅞	3⅞	4⅞	5¼	5¾	7	8¼	8¾
Diameter of Flanges.....	2½	2½	3	3	4	4½	5	6	7	7	8½	9
Screw Ends.....	\$1.35	1.35	1.50	1.85	2.55	3.30	4.50	6.70	11.35	16.50	30.50	39.00
Flange Ends.....	2.00	2.00	2.50	2.85	4.00	5.00	7.25	10.25	16.35	20.75	38.00	46.25
Sliding Stem and Lever, extra...	.70	.70	.70	.70	.70	.75	1.00	1.00	1.10	1.65	1.65	1.65

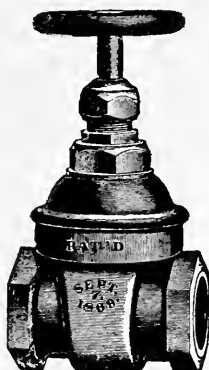
IRON BODY BABBITT SEAT GATE VALVES FOR STEAM AND WATER.—(SCREW OR FLANGE ENDS.)

Size, inches....	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15
Screw End, Inside Screw...	\$9.00	11.25	14.50	17.00	23.50	23.50	29.50	37.00	45.00	57.00	72.00	101.00	....	....
Flange End, " " ..	9.25	11.75	15.00	17.50	23.50	23.50	28.25	34.50	42.50	52.50	67.00	89.00	118.00	145.00
Sliding Stem & Lever, Ex..	2.10	2.50	3.25	3.25	3.75	3.75	5.00	5.00	8.75	8.75	10.25	11.60	....	....
Face to Face, Screw Ends.	6⅞	7½	8⅞	9⅞	9¾	10¼	11⅞	12⅞	12½	13⅞	13¾	....	....	....
Face to Face, Flange Ends	7⅞	8¼	8¾	9¾	10¼	9¾	10¾	11½	11¾	12¾	13¾	14¾	15¾	16¾

IRON BODY BRONZE MOUNTED BABBITT SEAT GATE VALVES FOR WATER AND STEAM.—(SCREW OR FLANGE ENDS.)

Size, inches.....	16	18	20	22	24	26	30	36	40	42
Flange End, Ins. Scr.....	\$155.00	210.00	250.00	290.00	370.00	435.00	658.00	900.00	1425.00	1530.00
Geared Indicator, " " , Extra...	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
By-Pass, " " , " ...	46.00	48.00	51.00	60.00	64.00	64.00	80.00	114.00	114.00	116.00
Face to Face, Flange Ends.....	18¾	20	21	22½	24	....	....	....	....	....

# CHAPMAN ALL-IRON GATE VALVES.



## SEMI-STEEL BABBITT SEAT GATE VALVES FOR AMMONIA.

TO STAND ORDINARY PRESSURE.

	Screw Top								Bolt Top	
Size, inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Screw End	\$3.00	3.00	3.25	3.65	4.35	5.00	6.10	7.85	11.10	15.50
Flange End	3.40	3.40	3.70	4.20	5.00	5.75	7.00	8.85	11.70	15.85
Drilling End Flanges, Extra					.35	.12	.12	.12	.16	.16

	Bolt Top									
Size, inches	3 1/2	4	4 1/2	5	6	7	8	9	10	12
Screw End	\$18.60	21.50	26.50	31.25	40.00	48.00	58.00			
Flange End	19.50	22.25	26.75	31.25	40.00	47.00	56.00			
Drilling End Flanges, Extra	.16	.16	.16	.20	.25	.35	.40	1.10	1.40	2.00

## EXTRA HEAVY SEMI-STEEL BABBITT SEAT GATE VALVES FOR AMMONIA.

TESTED TO 1000 LBS. PRESSURE.

	Screw Top								Bolt Top	
Size, inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Screw End	\$5.50	5.50	5.75	6.20	7.50	8.75	10.25	12.75	16.00	21.50
Flange End, Plain Flanges	5.80	5.80	6.10	6.80	8.20	9.50	11.50	14.50	16.75	22.50
Flange End, Tongued Flanges					8.60	10.00	12.00	15.00	18.00	24.00
Drilling End Flanges, Extra					.20	.20	.20	.20	.35	.35

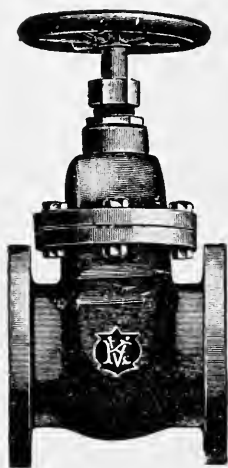
  

	Bolt Top									
Size, inches	3 1/2	4	4 1/2	5	6	7	8	9	10	12
Screw End	\$25.50	30.00	36.50	47.00	56.25	72.00	83.00			
Flange End, Plain Flanges	27.50	31.00	37.25	48.00	58.00	73.00	85.00		119.00	163.00
Flange End, Tongued Flanges	29.00	32.75	39.00	50.00	59.50	75.00	87.00		122.00	166.00
Drilling End Flanges, Extra	.40	.55	.80	1.00	1.50	1.75	1.75	2.10	2.50	3.50

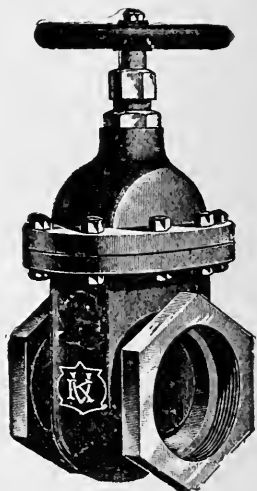
KENNEDY GATE VALVES.



Composition,  
Screwed.



Iron Body, Composition  
Mounted, Flanged.



Iron Body, Composition  
Mounted, Screwed.

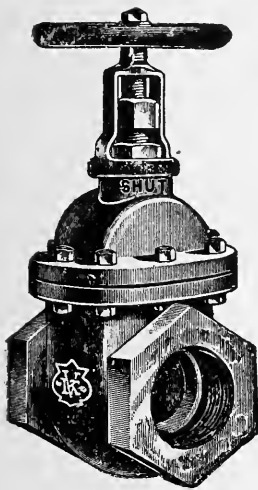
COMPOSITION VALVES, DOUBLE GATE, SCREWED AND FLANGED, WITH  
STATIONARY AND RISING SPINDLES.

Diameter of opening, inches.....	3⁄8	1⁄2	3⁄4	1	1¼	1½	2	2½	3	3½	4	5	6
Face to face, screw ends.....	2¼	2⅝	3	3¼	3½	4¼	4¾	4⅞	5¾	6	7	....	
“ “ flange ends.....			3	3	3½	4	4¾	5½	6	6¼	7	8	9
Diameter of flanges.....		3	3	4	4½	5	6	6½	7	7½	9	10	11
Screw ends.....	\$1.40	1.40	1.80	2.50	3.50	5.00	7.50	14.00	20.00	32.00	40.00	55.00	78.00
Flange ends.....	2.50	2.75	3.50	4.50	5.50	7.50	12.00	18.00	25.00	40.00	48.00	66.00	94.00
WOOD WHEEL—R.B.Fin.Trim.	1.90	2.00	2.50	3.25	4.25	5.75	8.25						
“ “ Fin. all over.	2.90	3.00	3.50	4.50	6.00	7.50	11.00						

IRON BODY, COMPOSITION MOUNTED, DOUBLE GATE VALVES, SCREWED  
AND FLANGED. BOLTED TOP.

Diameter of opening, inches.....	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Face to face, screw ends.....	4	5	6	6¼	6¾	7	7⅝	8	8⅝	9	10¼	11½	11½	13¼
“ “ flange ends.....	5¼	6	6⅛	7½	7½	8¼	8½	9⅛	9⅞	10⅝	11	11¾	12¼	13¼
Diameter of flanges.....	5	6	7	8	8½	9	9½	10	11	12	13	15	16	18
Screw ends.....	\$10.00	12.00	15.00	18.00	20.00	23.00	25.00	30.00	43.00	53.00	60.00	70.00	95.00	
Flange ends.....	10.00	12.50	15.50	19.00	21.00	24.00	27.00	32.00	43.00	53.00	60.00	70.00	95.00	

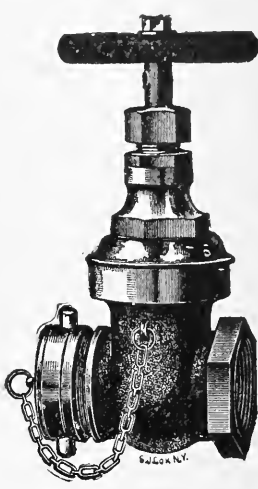
KENNEDY GATE VALVES.—Continued.



Indicator Valve.



All-Iron Gate.



Hose Valve.

ALL IRON DOUBLE GATE VALVE, FOR GAS, OIL OR AMMONIA.

Diam. of opening, inches..	2	2½	3	3½	4	5	6	7	8	10	12
Face to face, screw ends..	5	6	6¼	6¾	7	8	8⅝	10	10¼	11½	13¼
Face to face, flange ends..	6	6½	7½	7½	8¼	9½	9⅞	10⅝	11	12¼	13¼
Diameter of flanges.....	6	7	8	8½	9	10	11	12	13	16	18
Screw or flange ends.....	10.00	12.00	15.00	18.00	20.00	25.00	30.00	43.00	53.00	70.00	95.00
Sliding stem and lever .....	11.00	16.00	20.00	22.00	25.00	-----	-----	-----	-----	-----	-----

These Valves should not be used for Water.

FIRE OR INDICATOR VALVE, COMPOSITION.

Diameter of opening, inches.....	1½	2	2½	3	3½	4
Screw ends.....	\$9.25	\$13.75	\$20.25	\$27.25	\$41.00	\$51.75
Flange ends.....	11.25	17.75	24.25	32.25	49.00	59.75

FIRE OR INDICATOR VALVE, IRON BODY, COMPOSITION MOUNTED.

Diameter of opening, ins.	2	2½	3	3½	4	4½	5	6	7	8	10	12
Screw ends.....	13.75	16.50	20.25	24.00	26.75	30.00	32.50	39.00	53.50	65.00	85.00	113.00
Flange ends.....	13.75	17.00	20.75	25.00	27.25	31.00	34.50	41.00	53.50	65.00	85.00	113.00

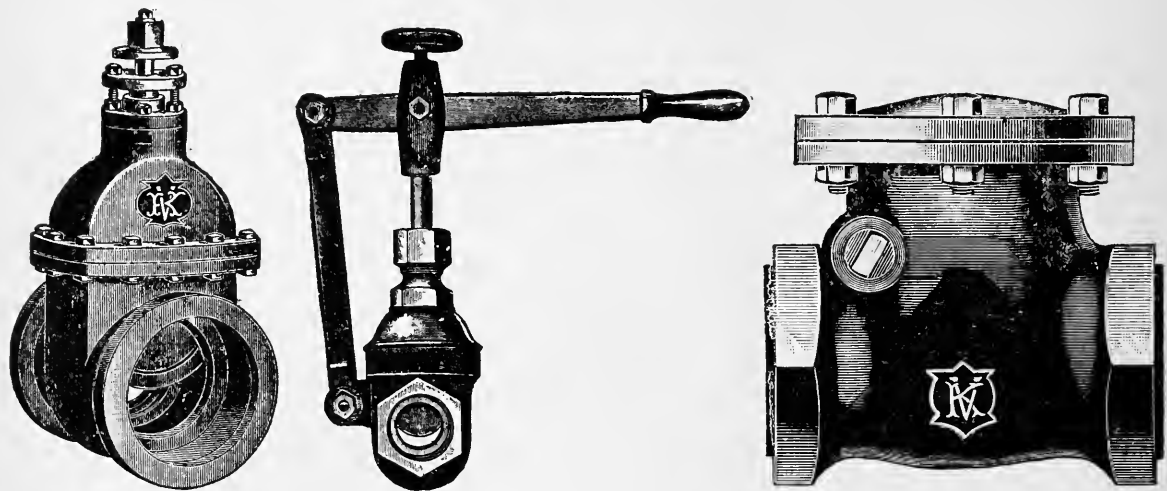
COMPOSITION HOSE VALVES.

WITH OR WITHOUT CAP AND CHAIN.

When other than New York Standard Thread is required send gauge or coupling.

Diameter of opening, inches .....	1	1¼	1½	2	2½	3
Without cap and chain .....	\$2.50	\$3.50	\$5.00	\$7.50	\$14.00	\$20.00
Finished all over, with finished brass wheel .....	5.00	6.75	9.00	13.00	22.00	29.00
Finished and nickel plated all over .....	5.75	7.50	9.75	13.75	23.00	30.00
Finished brass cap and chain, extra.....	1.25	1.35	1.50	1.75	2.50	3.50

KENNEDY GATE AND CHECK VALVES.



Bell End Water Gate.

Quick Opening Sliding Stem  
and Lever Valve.

Composition and Iron Body  
Swinging Check Valves.

IRON BODY WATER GATES, COMPOSITION MOUNTED.

Diam. of Opening, Inches----	2	3	4	5	6	8	10	12	14	16	18	20	24
End to End of Pipe when laid in Bell,	3	3¼	4	5	5	5¼	6	6¾	7¼	7½	8½	8¾	9½
Diameter of Bell Socket-----	3⅞	4⅝	5¾	6⅞	7⅞	10	12	14¼	16¼	18½	20½	22¾	26¾
Bell or Spigot End, \$	10.00	15.00	20.00	25.00	30.00	53.00	70.00	95.00	---	---	---	---	---

SLIDING STEM AND LEVER VALVE, COMPOSITION.

Diameter of Opening, Inches-----	½	¾	1	1¼	1½	2	2½	3	3½	4
Screw Ends-----	\$2.50	3.00	4.00	5.00	7.00	10.00	19.00	25.00	38.00	47.00
Flange Ends-----	4.00	4.75	6.00	7.00	9.50	14.50	23.00	30.00	46.00	55.00

IRON BODY, COMPOSITION MOUNTED.

Diameter of Opening, Inches.....	2½	3	3½	4	4½	5	6	7	8	9	10	12
Sliding Stem and Lever Screw Ends.....	\$16.00	20.00	22.00	25.00	28.00	30.00	35.00	48.00	58.00	65.00	75.00	100.00
Sliding Stem and Lever Flange Ends.....	16.00	20.00	22.50	25.00	28.50	32.00	37.00	48.00	58.00	65.00	75.00	100.00

COMPOSITION STRAIGHTWAY SWINGING CHECK VALVES.

Diameter of Opening, Inches-----	½	¾	1	1¼	1½	2	2½	3
Face to Face, Screw Ends-----	2½	3	3⅞	3⅞	4¼	5¼	7⅞	8
Screw Ends-----	\$1.30	1.75	2.25	3.25	4.25	6.25	11.50	16.00

IRON BODY, COMPOSITION MOUNTED.

Diameter of Opening, Inches.....	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Face to Face, Screw Ends.....	7¾	8¾	8¾	9¾	12¼	12	13¾	....	15¼	....	....	....	....
Face to Face, Flange Ends.....	7½	8	8¾	10⅞	....	12	13½	....	15¼	....	18¾	24½	....
Diameter of Flanges.....	7	7	8½	9	9½	10	11	12	13	15	16	18	....
Diameter of Bell Socket.....	4⅞	5¾	5¾	6¾	7¾	6¾	7¾	....	10	....	12	14¼	....
End to End of Pipe when laid in Bell...	7	7¾	7¾	8¾	....	8¾	9	....	11½	....	12¾	....	....
Screw Ends.....	\$6.25	10.00	12.00	16.00	20.50	23.00	25.50	32.00	41.50	50.00	62.50	77.50	97.00
Flange Ends.....	6.25	10.00	12.00	16.00	21.50	24.00	27.00	32.50	43.00	50.00	62.50	77.50	97.00
Bell Ends.....	6.25	....	12.00	16.00	18.00	....	25.00	32.00	....	50.00	62.50	73.00	92.00
Leather or Vulcanized Rubber Disc, extra	90	1.50	1.75	2.00	2.50	....	3.00	3.75	4.50	5.25	5.50	5.75	6.00



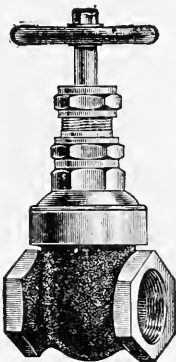
LUDLOW BRONZE VALVES, DOUBLE GATE.

Tested at 300 lbs. pressure per square inch, water pressure. Test guaranteed.



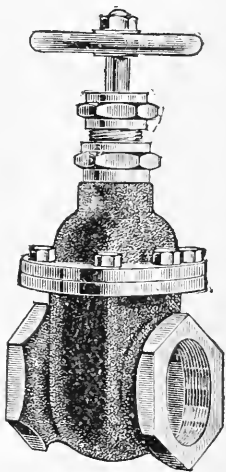
SCREWED ENDS

with Screwed Cover and Rising Stem. Style of sizes, 3/8, 1/2, 3/4 and 1 inch.



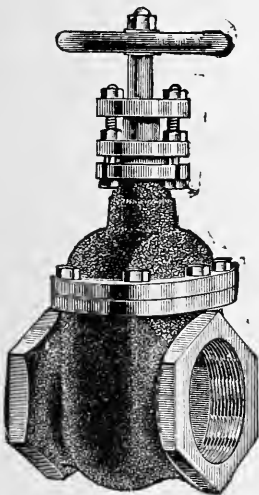
SCREWED ENDS

with Screwed Cover and Screwed Stuffing Box. Style of sizes, 1 1/4, 1 1/2 and 2 inches.



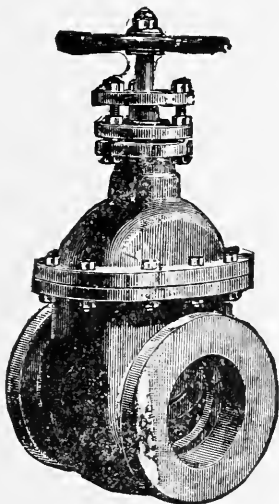
SCREWED ENDS

with Bolted Cover and Screwed Stuffing Box. Style of sizes, 2 1/2 to 6 inches, inclusive.



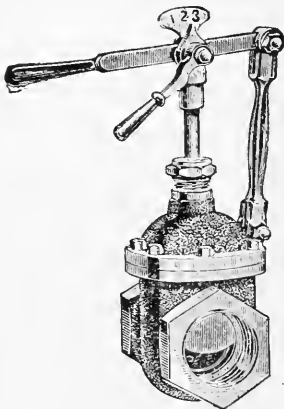
SCREWED ENDS

with Bolted Cover, Bolted Stuffing Box and Follower. Style of sizes, 7 inches and above.



FLANGED ENDS

with Bolted Cover, Bolted Stuffing Box and Follower. Style of sizes, 7 inches and above.



SLIDING STEM AND LOCK LEVER VALVE.

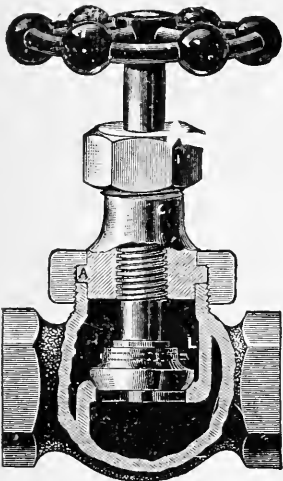
With this arrangement the Gates can be opened or closed by a single movement, or held in any desired position by the Locking Lever. In small sizes a wheel takes the place of Locking Lever.

BRONZE VALVES—Double Gate.

Sizes, inches .....	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
Screwed Ends ..	1.40	1.40	1.80	2.35	3.40	4.40	6.25	13.75
Flanged Ends.....			3.70	4.15	5.70	7.40	11.00	18.75
For Slide Stem and Lever, add to list.....	.80	.80	.80	.80	1.00	1.00	1.25	1.75
Sizes, inches .....	3	3 1/2	4	4 1/2	5	6	7	8
Screwed Ends.....	15.50	23.50	34.00	45.00	52.00	76.00		
Flanged Ends.....	21.50	30.50	43.00	55.00	64.00	88.00	120.00	158.00
For Slide Stem and Lever, add to list .....	2.00	2.00	2.00	2.25	2.25	2.25		

IRON BODY WITH BRONZE MOUNTINGS.

Size.....	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	10	12
Screwed Ends....	5.00	5.50	6.00	7.00	10.25	12.25	16.50	18.00	23.00	25.00	30.50	38.00	45.00	64.00	82.50
Flanged Ends....	5.50	6.00	6.25	7.50	10.75	13.25	17.50	18.50	23.50	25.50	31.00	38.00	43.50	64.50	80.00
Hub Ends.....				7.00	10.00	14.50	16.00	17.00	22.00	24.00	28.00	37.00	42.00	60.00	76.00

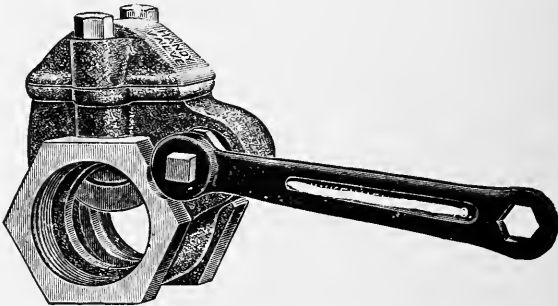


Regrinding Globe Valve.

LUNKENHEIMER VALVES.  
GLOBE AND ANGLE VALVES, BRASS.

Size, inches, . . . . .	1⁄8	1⁄4	3⁄8	1⁄2	3⁄4	1
Globe Valves, each,	.70	.70	.85	1.15	1.45	2.00
Angle Valves, “	.70	.70	.85	1.15	1.45	2.00

Size, inches, . . . . .	1 1⁄4	1 1⁄2	2	2 1⁄2	3
Globe Valves, each,	2.80	3.90	6.20	12.00	16.50
Angle Valves, “	2.80	3.90	6.20	12.00	16.50



Handy Gate Valve.

HANDY GATE VALVE.

Screwed Ends only, not made with Flange Ends.

Size, inches, . . . . .	1⁄2	3⁄4	1	1 1⁄4	1 1⁄2	2	2 1⁄2
Brass Body, each, . . . . .	1.60	1.80	2.50	3.50	5.00	7.50	13.50
Iron Body, Brass Trim'gs, each, . . . .	....	....	....	....	....	7.00	12.00
All Iron, each, . . . . .	....	3.40	4.00	4.50	6.00	7.00	12.00

Size, inches, . . . . .	3	3 1⁄2	4	4 1⁄2	5	6	8
Brass Body, each, . . . . .	19.00	40.00	60.00	....	....	....	....
Iron Body, Brass Trim'gs, each, . . . .	15.00	18.00	21.00	25.00	30.00	35.00	65.00
All Iron, each, . . . . .	15.00	18.00	21.00	25.00	30.00	35.00	65.00



“CLIP” DOUBLE SEATED SINGLE DISC GATE VALVES.

FOR ALL ORDINARY PRESSURES.      IRON BODY, BRASS MOUNTED.

Size, inches, . . . . .	1⁄2	3⁄4	1	1 1⁄4	1 1⁄2	2	2 1⁄2
Iron Body, B. M. Sc. Ends, each,	1.50	1.90	2.50	3.50	5.00	7.50	12.00

Size, inches, . . . . .	3	3 1⁄2	4	4 1⁄2	5	6
Iron Body, B. M. Sc. Ends, each,	15.00	18.00	20.00	23.00	25.00	30.00

Size, inches, . . . . .	1⁄2	3⁄4	1	1 1⁄4	1 1⁄2	2	2 1⁄2
All Iron Screw Ends, each, . . . . .	1.50	1.90	2.50	3.50	5.00	7.50	12.00

Size, inches, . . . . .	3	3 1⁄2	4	4 1⁄2	5	6
All Iron Screw Ends, each, . . . . .	15.00	18.00	20.00	23.00	25.00	30.00

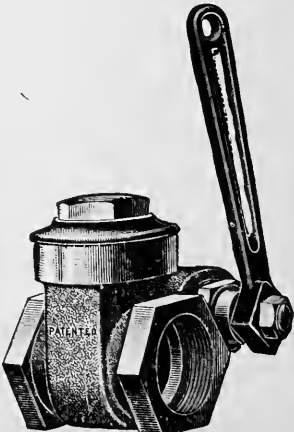
LEVER THROTTLE VALVE.

BRASS.

Screw Ends only, not made with Flange Ends.

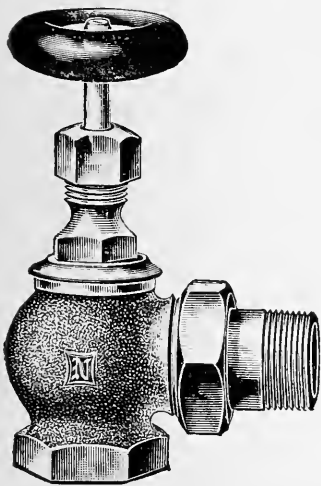
Size, inches, . . . . .	3⁄4	1	1 1⁄4	1 1⁄2	2	2 1⁄2
Brass Body, each,	3.00	4.00	5.00	7.00	10.00	19.00

IRON. Brass Mounted.						
Size, inches, . . . . .	2 1⁄2	3	3 1⁄2	4	5	6
Iron Body, Brass Mounted, each, . . . . .	16.00	20.00	25.00	30.00	35.00	40.00





## THE "N" RADIATOR VALVE.



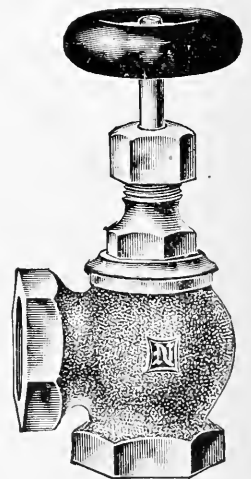
WITH UNION.

The need for a Radiator Valve which, while handsome in appearance, and of good material and workmanship, is low in price and amply good for working pressures up to ten pounds, has induced us to go into the manufacture and output of such a valve, cuts of which are submitted.

They are made both with and without unions and all are fitted with

### JENKINS' DISCS.

The list for these valves is the same as the regular price list.



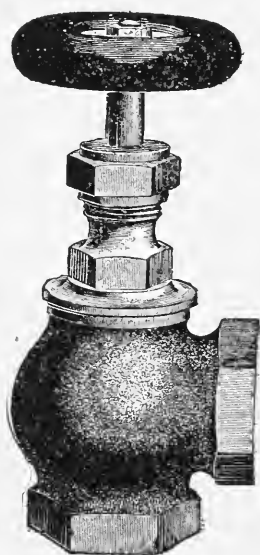
WITHOUT UNION.

*DISCOUNTS WILL BE GIVEN ON REQUEST.*

Sizes .....	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$
Wood Wheel, Rough Body, Nickel Plated all over, with Union.....	\$3.90	4.70	6.25	8.15
“ “ “ “ “ “ “ without “ .....	2.90	3.60	4.90	6.65

For our protection they are all marked as shown above, and may be ordered as "N" Valves.

## STANDARD BRASS DISC RADIATOR VALVES.

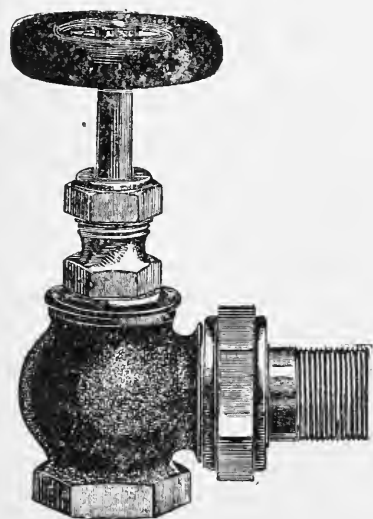


Rough Body.

Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Wood Wheel, Rough Body, plain.....	1.40	1.75	2.35	3.25	4.35	6.85
“ “ “ “ “ plated trimmings.....	1.60	2.00	2.65	3.55	4.65	7.35
“ “ “ “ “ plated all over.....	1.70	2.10	2.75	3.70	4.85	7.60
“ “ “ “ “ Finished all over.....	2.15	2.50	3.25	4.35	5.75	9.00
“ “ “ “ “ and plated all over.....	2.45	2.85	3.65	4.80	6.25	9.75
With Frink Seat, add to lists.....	.35	.40	.45	.50	.55	.65

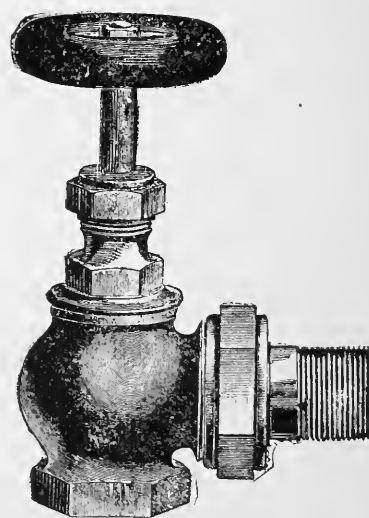


Finished all over.



Rough Body, with Union.

Size .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Wood Wheel, Union, Rough Body, plain.....	2.15	2.50	3.30	4.40	5.90	9.25
“ “ “ “ “ plated trimmings.....	2.35	2.75	3.60	4.70	6.25	9.75
“ “ “ “ “ all over.....	2.50	2.90	3.75	5.00	6.50	10.00
“ “ “ “ “ Finished all over.....	3.00	3.40	4.25	5.75	7.75	12.00
“ “ “ “ “ and plated all over.....	3.35	3.80	4.70	6.35	8.35	12.75
With Frink Seat, add to lists.....	.35	.40	.45	.50	.55	.65



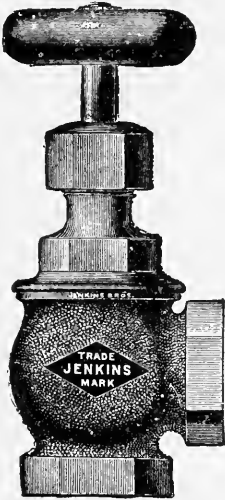
With Union, Finished.

Radiator Valves with Lock and Shield same List as with Wood Wheel.

JENKINS BROS. RADIATOR VALVES.



Wood Wheel Globe.



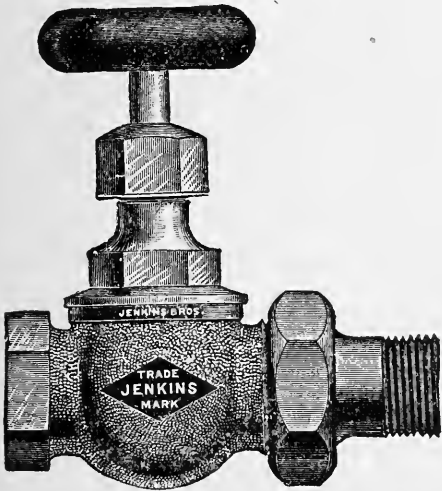
Wood Wheel Angle.



Lock Shield Angle.

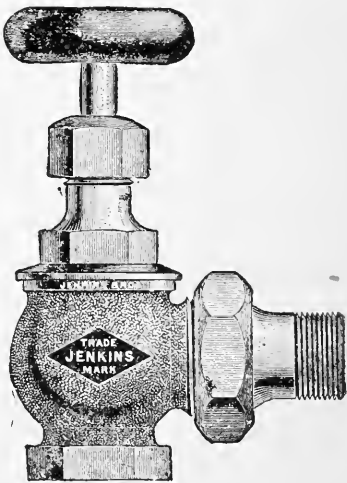
RADIATOR VALVES, SCREWED ENDS, R. OR L. THREADS, AS ORDERED.

No.	Size	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
1	Wood Wheels, rough body, finished trimmings.	1.50	1.85	2.00	2.50	3.20	4.50	6.25	10.50
2	“ “ finished all over	2.00	2.25	2.50	3.00	3.75	5.25	7.25	11.75
3	“ “ rough body, nickel plated trim's.	1.80	2.15	2.30	2.80	3.50	4.80	6.55	10.80
4	“ “ rough body, nickel plated all over	1.90	2.25	2.40	2.90	3.60	4.90	6.65	10.90
5	“ “ finished and nickel plated all over	2.40	2.70	2.90	3.40	4.15	5.65	7.65	12.15



Lock Shield Valves  
same price as Wood  
Wheel Valves.

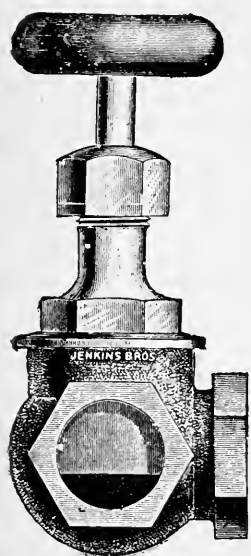
For Convenience  
Order Valves by  
Numbers.



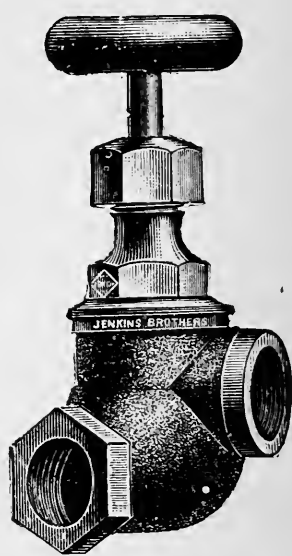
RADIATOR VALVES, GLOBE OR ANGLE, M. OR F. UNIONS, AS ORDERED.

No.	Size	1½	¾	1	1¼	1½	2		
6	Wood Wheels, rough body, finished trimmings	2.75	3.50	4.30	5.85	7.75	12.60		
7	“ “ finished all over	3.20	4.00	4.80	6.40	8.75	13.85		
8	“ “ rough body, nickel plated trimmings	3.05	3.80	4.60	6.15	8.05	12.90		
9	“ “ rough body, nickel plated all over.	3.15	3.90	4.70	6.25	8.15	13.00		
10	“ “ finished and nickel plated all over.	3.60	4.40	5.20	6.80	9.15	14.25		
Tee Handle Keys		¼	⅜	½	¾	1	1¼	1½	2
Price, each		.17	.17	.17	.17	.18	.18	.27	.27

## JENKINS BROS. RADIATOR VALVES—Continued.

CORNER RADIATOR VALVES,  
REGULAR AND OFFSET  
PATTERN.SCREWED ENDS, RIGHT OR LEFT  
THREADS, AS ORDERED.

WOOD WHEELS OR LOCK SHIELD.



Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
No. 1, Wood Wheels, rough body, finished trimmings.....	2.25	2.75	3.50	5.00	7.00	11.55
" 2, " " finished all over.....	2.75	3.25	4.25	5.75	8.00	12.95
" 3, " " rough body, nickel plated trimmings..	2.55	3.05	3.80	5.30	7.30	11.85
" 4, " " rough body, nickel plated all over...	2.65	3.15	3.90	5.40	7.40	11.95
" 5, " " finished and nickel plated all over...	3.15	3.65	4.65	6.15	8.40	13.35

With Male or Female Unions, as ordered.

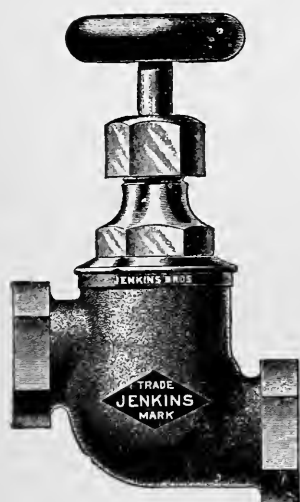
Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
No. 6, Wood Wheels, rough body, finished trimmings.....	3.05	3.85	4.75	6.45	8.55	13.85
" 7, " " finished all over.....	3.50	4.40	5.30	7.05	9.65	15.25
" 8, " " rough body, nickel plated trimmings..	3.35	4.15	5.05	6.85	8.85	14.15
" 9, " " rough body, nickel plated all over...	3.45	4.25	5.15	6.95	8.95	14.25
" 10, " " finished and nickel plated all over...	3.90	4.80	5.70	7.45	10.05	15.65

## OFFSET GLOBE VALVES.

Screwed Ends, Right or Left Hand Threads, as ordered.

Size.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
No. 1, rough body, finished trimmings..	2.75	3.50	5.00	7.00	11.55
" 2, finished all over.....	3.25	4.25	5.75	8.00	12.95
" 3, rough body, plated trimmings..	3.05	3.80	5.30	7.30	11.85
" 4, rough body, plated all over.....	3.15	3.90	5.40	7.40	11.95
" 5, finished and plated all over.....	3.65	4.65	6.15	8.40	13.35

With Male or Female Unions, as ordered.



Size.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
No. 6, rough body, finished trimmings..	3.85	4.75	6.45	8.55	13.85
" 7, finished all over.....	4.40	5.30	7.05	9.65	15.25
" 8, rough body, plated trimmings..	4.15	5.05	6.85	8.85	14.15
" 9, rough body, plated all over.....	4.25	5.15	6.95	8.95	14.25
" 10, finished and plated all over.....	4.80	5.70	7.45	10.05	15.65

FURNISHED WITH WOOD WHEELS OR LOCK SHIELD.

# THE "DETROIT" RADIATOR VALVES.

QUICK OPENING, FOR STEAM.

With Union. Opened and Closed with Three Movements.

PRICE LIST FOR BRASS DISC.

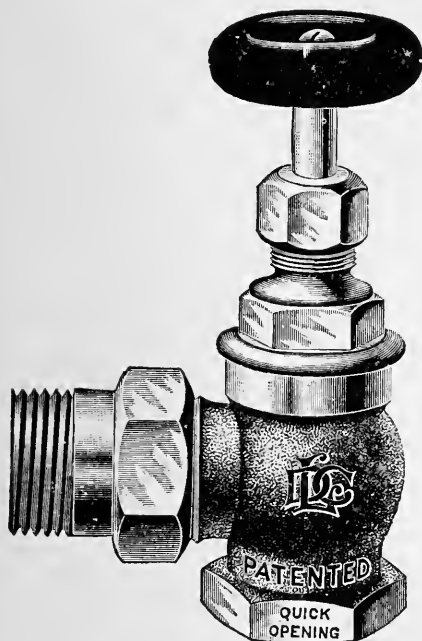
No.	Size.....	¾	1	1¼	1½	2
5	Rough body, finished trimmings..	\$2.45	\$3.25	\$4.50	\$6.50	\$10.00
6	Rough body, plated trimmings...	2.60	3.35	4.90	6.65	10.25
7	Rough body, plated all over....	2.85	3.65	5.05	7.10	10.85
8	Finished body.....	3.00	3.85	5.25	7.50	11.50
9	Finished body, plated all over...	3.40	4.30	5.80	8.10	12.35

WITH JENKINS DISC.

No.	Size.....	¾	1	1¼	1½	2
10	Rough body, finished trimmings..	\$3.50	\$4.30	\$5.85	\$7.75	\$12.60
11	Rough body, plated trimmings...	3.75	4.65	6.25	8.00	12.85
12	Rough body, plated all over .....	3.80	4.75	6.40	8.10	13.10
13	Finished body.....	4.60	4.80	6.40	8.75	13.85
14	Finished body, plated all over....	4.25	5.25	7.00	9.25	14.35
	Jenkins Discs.....	.10	.12	.18	.25	.36

In ordering use Numbers and Sizes *only*.

THREADS—Right Hand on Union;  
Right Hand on Bottom.



## "THE DETROIT" QUICK OPENING HOT WATER RADIATOR VALVE.

UNION VALVE. STEAM METAL.

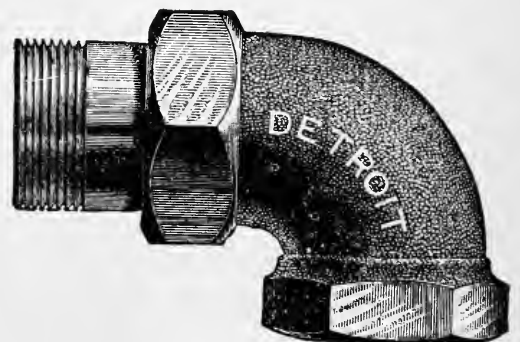
No.	Size .....	¾	1	1¼	1½	2
100	Rough body, finished trim'gs } .....	2.45	3.25	4.50	6.50	10.00
101	Rough body, plated all over } .....	2.85	3.65	5.05	7.10	10.85
102	Finished body... ..	3.00	3.85	5.25	7.50	11.50
103	Finished body, plated all over } .....	3.40	4.30	5.80	8.10	12.35

All Valves Threaded as described unless otherwise specified, and we shall decline to allow the return of such as may be incorrectly ordered.

Threads, Right Hand on Union,  
Right hand on Bottom.

## "THE DETROIT" UNION ELBOW.

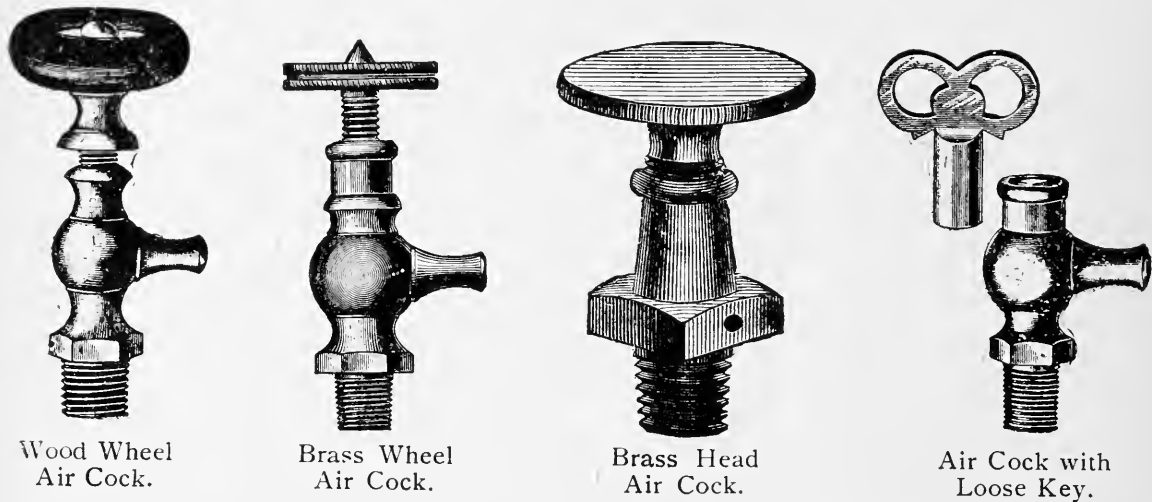
FOR UNION RADIATOR VALVE.



Size.....	¾	1	1¼	1½	2
Rough body, plated all over.....	2 00	2 50	3 20	4 00	7 00
Finished and plated all over.....	2 40	3 00	3 90	4 85	8 50

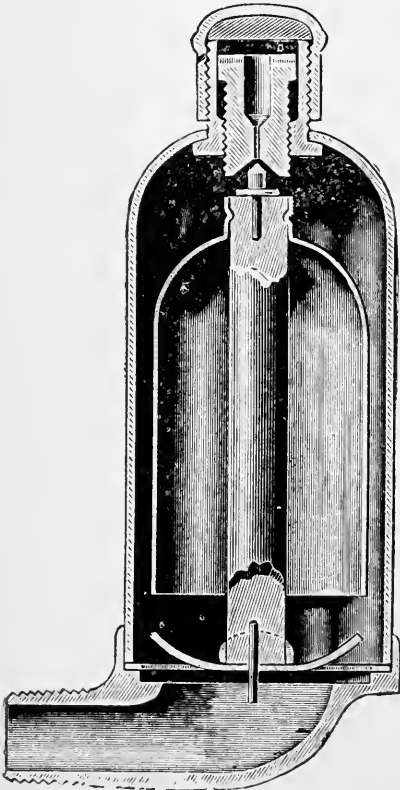


RADIATOR AIR VALVES.



Size.....			$\frac{1}{8}$	$\frac{1}{4}$
Wood Wheel, Finished.....	Each,	.65		.70
"    "    Nickel Plated.....	"	.70		.75
Brass    "    Finished.....	"	.60		.65
"    "    Nickel Plated.....	"	.65		.70
"    Head, Finished.....	"	.30		.35
"    "    Nickel Plated.....	"	.35		.40
Key Air Valve, Finished.....	"	.70		.75
"    "    "    Nickel Plated.....	"	.75		.80

AUTOMATIC RADIATOR AIR VALVES.



THE DAVIS No. 7 (FLOAT)  
AIR VALVE.

Closes both by floatation and expansion.

The constant adjusting hitherto required by valves of this description is a constant annoyance. This is caused by the gradual shrinkage or compression of the expanding composition.

By our construction this fault is entirely overcome. We recommend this valve for use where it is impossible or undesirable to run drip pipes to basement.

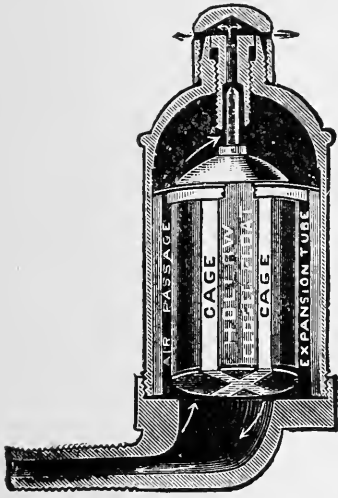
All valves nickel plated.

Each.....	\$ 1.25
Per dozen.....	15.00

## AUTOMATIC RADIATOR AIR VALVES.

“EUREKA”

### AUTOMATIC AIR VALVES



Have a hollow, closed float, light and buoyant; rises from the least water and closes valve. Valve stem is riveted to top of float and made of gun metal, so will not corrode. Have a hard rubber expansion cylinder, that elongates or expands  $\frac{3}{64}$  in. from the top. Owing to the deflector attached to bottom of cylinder no in-rushing air or steam can reach float to raise it by pressure. They are all tested at 100 pounds pressure, and adjusted to close against steam as soon as the heat reaches the valve, and against the leakage of water soon as it reaches the float, adapting them for either steam or water.

Cap screws on, and can be locked with the plyers, so no meddling with the adjustment. All joints are screw threaded. No soldered joints. Adjusting screw passes through a stuffing box and is packed so no leakage around thread. They are adjusted at factory. Anyone can apply them. Made side inlet, for radiators. Bottom inlet, for coils, indirect, steam traps, etc. Price, each.....\$1.00

With Heat Controller attachment, useful in mild weather when but little heat is required, as a portion of the radiator can be made inoperative, making it unnecessary to open and close supply valve.



No. 2

Price.....\$1.15

15c. extra each net for Heat Controller attachment.

### “VAN AUKEN” PATTERNS.

A thoroughly tried and fully guaranteed valve of the highest grade.



Perfected Duplex No. 1.

Price.....\$1.15 each.

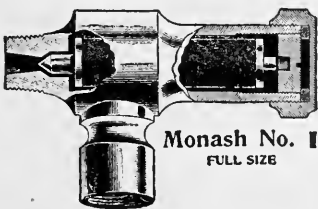
Has a tube connection to conduct foul air from radiator into basement, or elsewhere, so that it will not be discharged into occupied room. Designed for fine residence work.



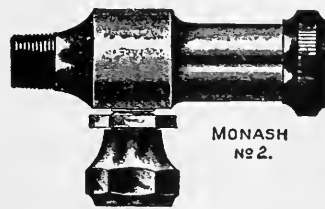
No. 4

Price.....\$1.55 each.

## MONASH AUTOMATIC AIR VALVE.



Monash No. 1  
FULL SIZE



MONASH  
No. 2.

No. 1, Finished and Nickel Plated, per doz.....	\$7.50
No. 2, With Union Drip Connection, per doz.....	8.35
Drip Cup for No. 1 Valve, per doz.....	2.00

# AUTOMATIC RADIATOR AIR VALVES.

PERFECTED DUPLEX No 3.

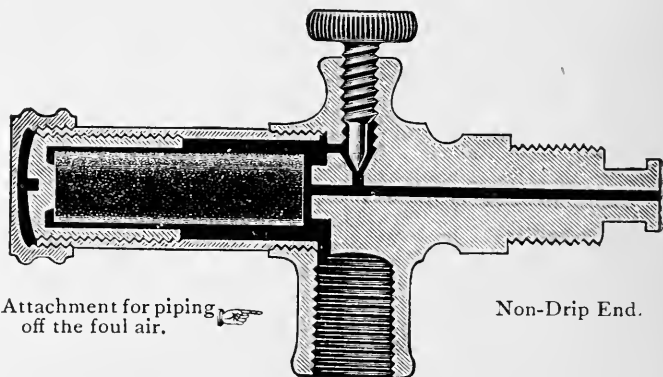
FOR INDIRECT RADIATION.

List, each..... \$1.15

THE "PERFECTION."

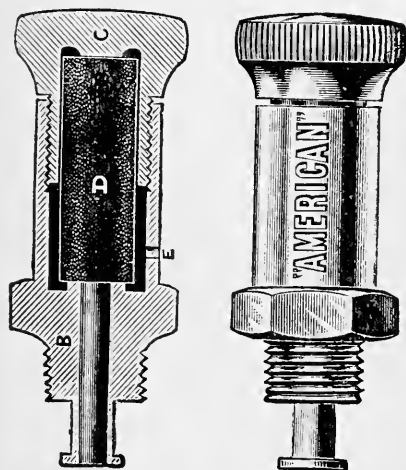


Perfected Duplex No. 3.



Per dozen..... \$12.00

## "AMERICAN" SPECIAL NON-CORROSIVE COMPOSITION STEM.



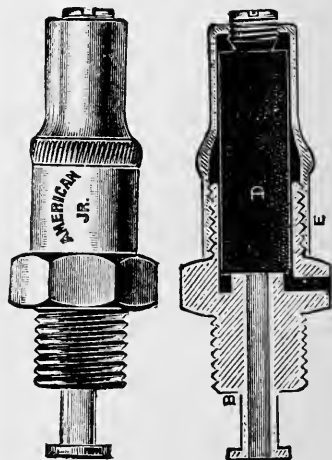
"American."

Which, owing to superior construction, can be brought with great force against the valve-seat without turning or injury to either. This feature makes the "American" practically indestructible. The Special Composition Stem will not corrode nor adhere to the valve seat, as would be the case if it were capped with metal faces.

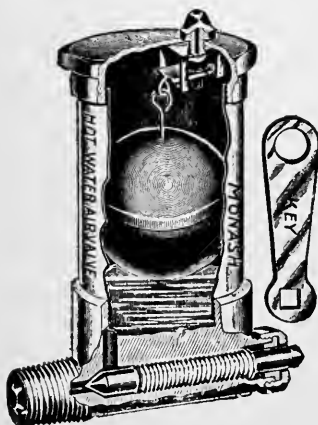
"AMERICAN, JR."

After adjusting the little set screw it can be used as a positive valve without change, and cannot be tampered with. The Expansible Stem cannot be injured by screwing down the operating piece too tight.

Price, each.....\$1.00



"American Jr."



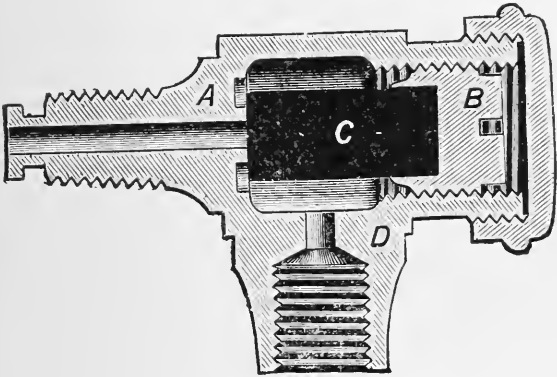
## MONASH HOT-WATER AIR-VALVE.

The Monash Positive and Automatic Hot-Water Air-Valve is recommended as the most practical and successful automatic valve yet devised for use with hot water.

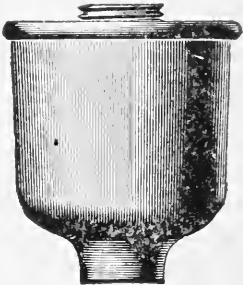
List price, each..... \$3.00

JENKINS IMPROVED AUTOMATIC AIR VALVES.

SUITABLE FOR HIGH OR LOW PRESSURE.



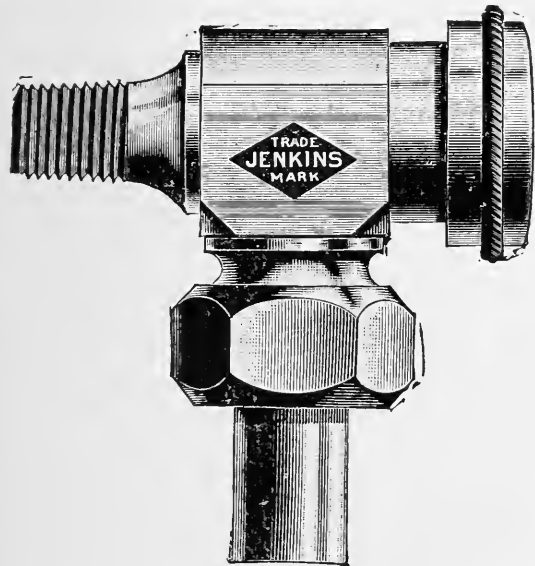
DESCRIPTION.—A, inlet; B, screw for setting; C, an expansible plug; D, outlet, tapped to connect drip-pipe or drip-cup.



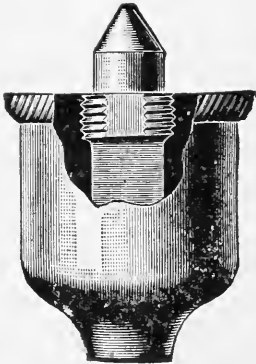
Drip-Cup.

PRICE.

Finished and Nickel Plated, per dozen	\$7.50
Drip-Cups, Nickel Plated, " "	2.00



Jenkins Automatic Air Valve, with Union Drip Connection.



Auxiliary Valve and Drip-Cup.

JENKINS AUXILIARY VALVE AND DRIP CUP

is so designed that when attached to the Jenkins Automatic Air Valve the latter can be used either as an automatic, or a direct valve with a drip-cup. By its use the automatic can be kept under control of the attendants, and in mild weather, when kept closed, it prevents the radiator from fully heating.

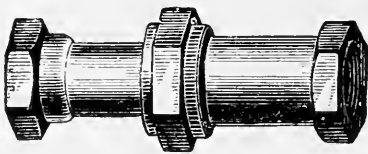
PRICE.

Finished and Nickel Plated, per doz., \$2.50

FINISHED AND NICKEL PLATED,  
per dozen.

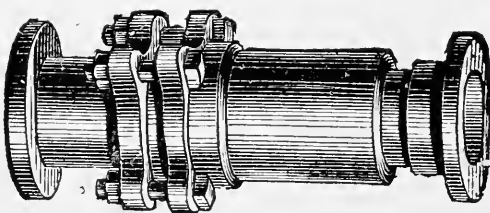
1/8 inch Inlet, 1/8 inch Union	\$ 9.50
1/8 " 1/4 "	10.00
1/4 " 1/4 "	10.00

EXPANSION JOINTS.



BRASS EXPANSION JOINTS—EASTERN TRAVERSE.

Size.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Brass Expansion Joints, Screwed.....	3.80	4.00	4.90	6.30	7.40	9.10

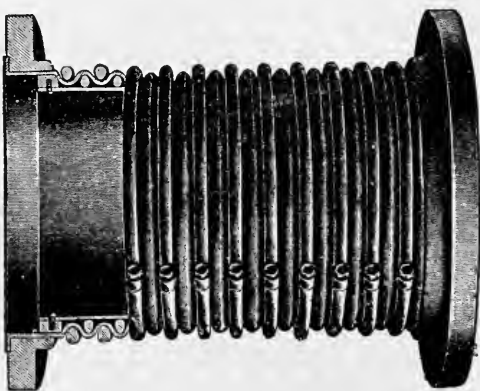


IRON BODY EXPANSION JOINT FLANGED

All 6 inch Traverse.

Size.....	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6
Iron Body Expansion Joints, Screwed.....	11.00	13.00	17.50	25.00	30.00	40.00	45.00	55.00
Iron Body Expansion Joints, Flanged.....	18.00	20.00	25.00	35.00	40.00	50.00	55.00	65.00

THE WAINWRIGHT CORRUGATED COPPER EXPANSION JOINT.



Size-----	1½	2	2½	3	3½	4	4½	5	
Price-----	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00	
Size-----	6	7	8	9	10	12	14	16	18
Price-----	75.00	90.00	125.00	135.00	165.00	225.00	300.00	400.00	500.00

These Joints are made of soft seamless drawn corrugated copper tubes, which close with the expansion and open with the contraction of the line of pipe in which they are placed. We guarantee satisfaction when placed in accordance with our directions.

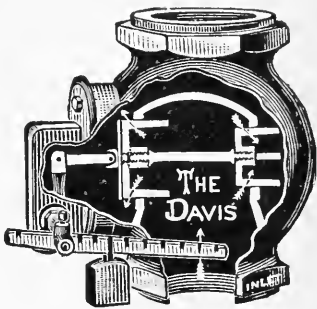
DAVIS NOISELESS BACK-PRESSURE VALVE.

The Davis valve is constructed on an entirely new and unique principle. Instead of a flat valve to hammer the seat at each stroke of the engine, it has a sliding valve which renders it *perfectly noiseless in operation*. This valve consists of two seats, but of different areas, and instead of the resistance of the whole area of the pipe to weight back *as on all other valves*, the resistance is only the difference in the area of the two seats, one partly balancing the other. By this construction only one-quarter the usual amount of weight is required even for high pressure.

Each valve full area of corresponding size of pipe.

In ordering valves for condensing engines it must be so stated, as all valves are made for non-condensing engines unless otherwise ordered.

Valves are not fitted tight unless so ordered.

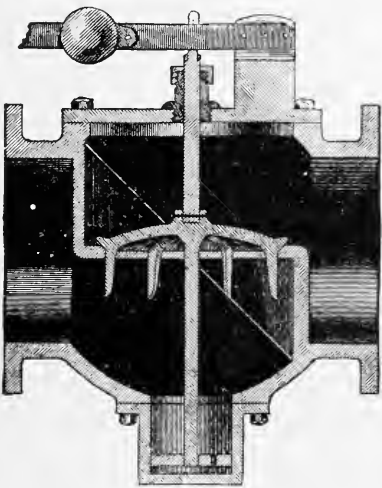


Size, Inches .....	2	2½	3	3½	4	4½	5	6	7	8
Each .....	\$14.	16.	18.	22.	25.	30.	40.	60.	80.	100.
Length Screw-End Valves, In*	7½	7½	9½	9¾	10½	11	11¾	13¾	15	....
Length Flanged Valves, In....	SCREW END		9½	9¾	10¼	11	11¾	13¾	15	16½
Diam. of Flanges, Inches.....	ONLY.		7½	8	8½	9	10	11	13	14

Size, Inches .....	9	10	12	14	16	18	20	22	24
Each .....	\$120.	145.	220.	345.	465.	600.	750.	900.	1050.
Length Flanged Valves, In....	18	19	21	23	26	29½	33	36	39
Diam. of Flanges, Inches.....	16	17	19	20	23	25	27	29	32

\* Valves from 3 to 7 in. inclusive made either flanged or screwed end. Larger sizes flanged end only.

THE KIELEY NOISELESS BACK-PRESSURE VALVE.

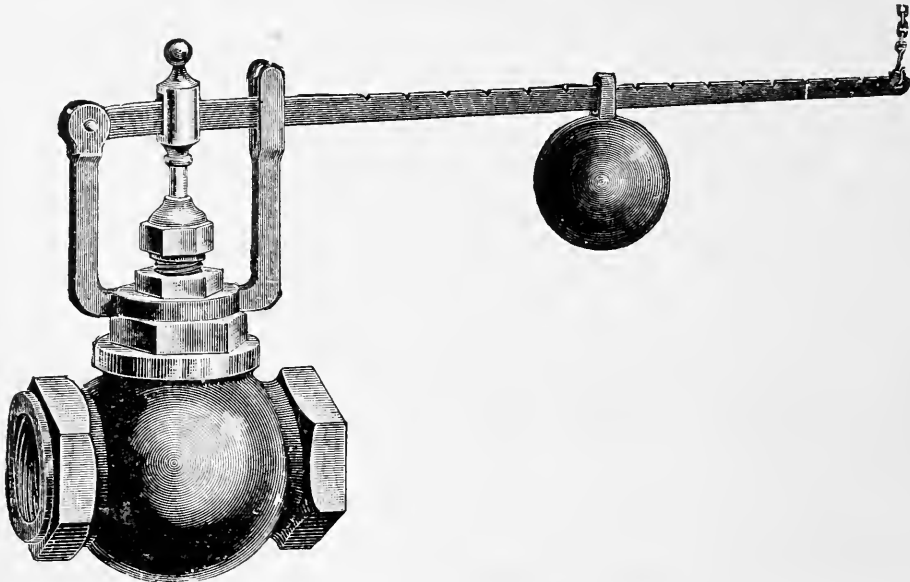


The Kieley Valve is simple in construction, is guaranteed absolutely noiseless and steam tight. It is extremely sensitive, and can be regulated to carry any back pressure that may be required. The lever can be placed in any position desired by simply turning the top.

The valve is made for both vertical and horizontal mains.

Size, Inches.....	2	2½	3	4	5	6	7	8	10	12
Diameter, Flanges.....	6	7	8	10	11	12	13	14	16	20
Face to Face Flanges...	6¼	7	8½	10½	11¾	13¾	14¾	15¾	19½	24½
Price, each.....	\$20.00	24.00	30.00	40.00	55.00	75.00	100.00	130.00	200.00	275.00

# NASON'S QUICK OPENING ELEVATOR VALVE WITH BALANCED DISCS.



They are offered to the trade as the most reliable valve made for the automatic and positive control of the speed of all pumps and engines which are used for tank service in connection with elevators, or for pumping water into reservoirs for general use.

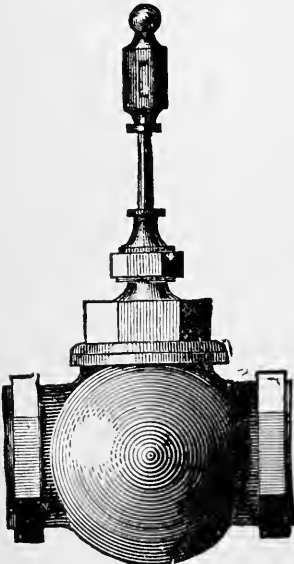
A small difference in the diameters of the two discs permits the passage of the lower through the upper opening. Compensation for the difference in areas is provided by the weighted lever.

Being connected in the line of steam supply to the pump to be regulated, they are operated by a float placed either in the upper or lower tank of the elevator, and as a movement in the valve spindle of from 1/2 in. to 2 in. (depending upon its size) is sufficient to entirely open or close it, their extreme sensitiveness is apparent.

This valve is made as shown in the above cut, either with yoke, lever, and weight, or without these additions, the spindle being in the latter case left plain on the upper end, as with our regular Balanced Disc Governor Valve.

Sizes.....	1 in.	1 1/4 in.	1 1/2 in.	2 in.	2 1/2 in.	3 in.	3 1/2 in.	4 in.
Price, Brass.....	5.00	6.50	8.50	13.00	21.00	40.00	50.00	65.00
Price, Iron Body. ....	----	----	----	----	----	----	----	50.00

# NASON'S BALANCED GOVERNOR VALVE. FOR STEAM ONLY.



Balanced Governor Valve.

In this valve the port openings are of exactly the same size. The openings are each fitted with cylindrical plugs, which are ground with extreme care into the ports and work with a minimum of friction.

As the areas are identical no compensating weight is necessary, and the valve is balanced at all points of its stroke.

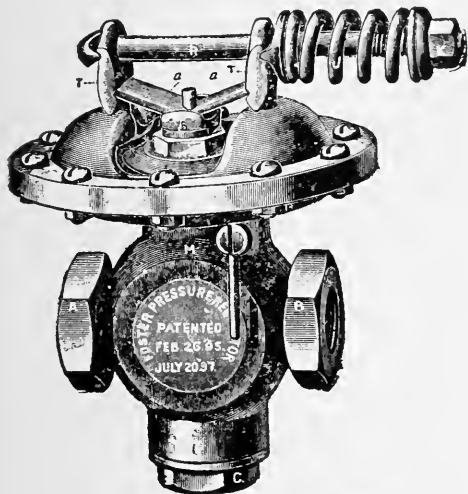
Owing to the method of constructing the bearings and the liability to wear if a lubricant is not used, or in the presence of grit or sediment, they are recommended for steam use only.

Size.....	1	1 1/4	1 1/2	2	2 1/2	3
Price, Brass....	5.00	7.50	9.00	15.00	21.00	40.00



FOSTER PRESSURE REGULATORS.

NEW "CLASS W."



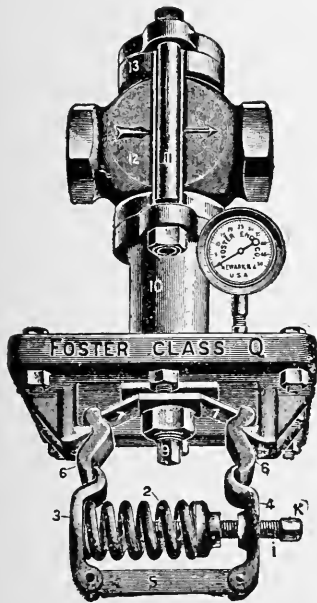
CLASS "W."

IMPORTANT FEATURES.

- 1. A compensating spring movement exerting a uniform power on the diaphragm, without regard to the opening of the valve.
- 2. A compensating balanced valve insuring steam tight seats, regardless of pressure or temperature.
- 3. Full steam-way through the valve.
- 4. Great simplicity of construction and operation.
- 5. No friction of parts.
- 6. No ports to become clogged.
- 7. No dash-pot.
- 8. Noiseless—no "chattering."
- 9. Can be taken apart for regrinding or repairs, without removal from pipe.
- 10. Used either as an angle valve, or as a straightway valve.
- 11. Diaphragm and springs can be removed or renewed without shutting off steam, and in event of these or their connecting parts breaking, the valve will continue to deliver steam while repairs are being made.

- 12. It is a perfect Pump Governor, capable of controlling a pump operating pressures from 5 to 5,000 lbs.
- 13. The whole operation, either as a Pressure Regulator or a Pump Governor, is absolutely automatic, requiring no attention after once being adjusted as to pressures.

Size .....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	7	8	10	12	14	16	18
Screwed .....	18.	20.	22.	28.	35.	44.	57.	72.	90.	100.	135.	180.							
Flanged .....					37.	46.	60.	75.	95.	105.	140.	185.	220.	260.	350.	450.	575.	700.	875.



CLASS "Q."

NEW "CLASS Q."

FOR STEAM HEATING.

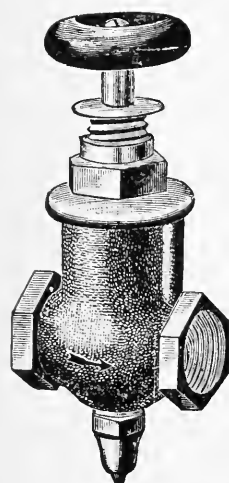
This new Reducing Valve is specially designed for Steam Heating, or for other service where the delivery pressure does not exceed 15 lbs. on the square inch.

It is not intended to take the place of the Foster Standard "Class W," but to meet the demand for a lower priced valve for some services where it will answer its purpose as well as a more expensively constructed one.

The diaphragm is composed of sheet rubber, which any engineer can renew, and is protected from the heat of the steam by water of condensation. It is also protected by steel backing plates which prevent undue strain or expansion of the rubber.

Size .....	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Screwed .....	20	24	28.	35.	40.	48.	55.	70.	85	120.			
Flanged .....				38	43.	52.	60.	75.	90	125.	200.	300.	350.

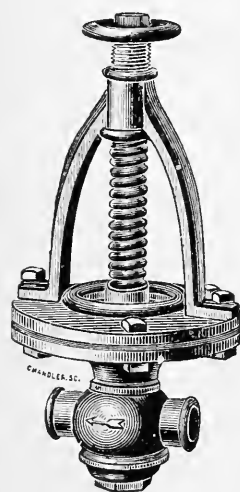
# PRESSURE REGULATORS.



CURTIS  
REGULATOR FOR STEAM AND AIR.

Size .....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Each .....	22.00	22.00	28.00	35.00	44.00	57.00
Size .....	3	4	5	6	7	8
Each .....	72.00	100.00	135.00	180.00	210.00	250.00

Special quotations for larger sizes.

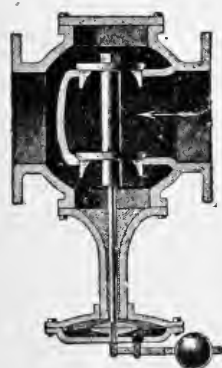


CURTIS  
WATER PRESSURE REGULATOR.

Size .....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Each .....	17.00	22.00	28.00	35.00	44.00	57.00	72.00

Adapted for Service Mains in Dwellings and Public Buildings.

Also for controlling pressure in connection with  
Water Motors, Hydraulic Elevators, etc.

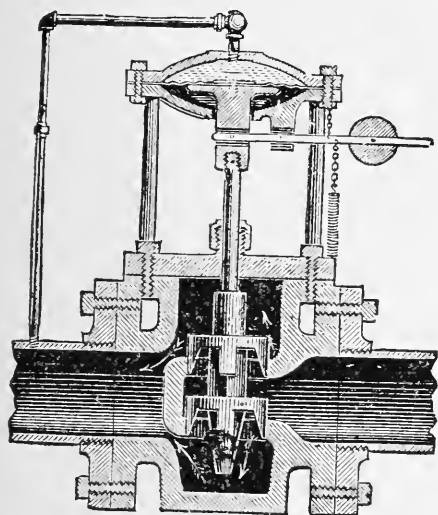


"EUREKA"  
PRESSURE REGULATOR FOR STEAM  
HEATING APPARATUS.

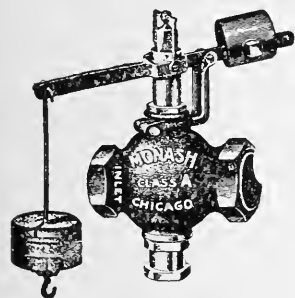
Size .....	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4
Diam. Flgs..					7	8	10
Face to Face.					7	8	$10\frac{1}{8}$
Each .....	22.00	28.00	35.00	44.00	57.00	72.00	100.00
Size .....	5	6	7	8	9	10	12
Diam. Flgs..	11	12	13	14		16	18
Face to Face.	$11\frac{1}{4}$	$12\frac{1}{4}$	$13\frac{1}{4}$	$14\frac{1}{4}$		$16\frac{1}{4}$	$18\frac{1}{4}$
Each .....	135.00	180.00	225.00	275.00	350.00	350.00	470.00

# PRESSURE REGULATORS—Continued.

## THE "ACTON."



Size, 1	inch	Price, \$
1 1/4		22.00
1 1/2		28.00
2		35.00
2 1/2		44.00
3		57.00
3 1/2		72.00
4		86.00
4 1/2		100.00
5		117.00
6		135.00
7		180.00
8		215.00
9		250.00
10		300.00
12		400.00
15		500.00
18		650.00
		800.00



## THE "MONASH."

Inlet.....	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	7	8	10
Outlet....	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	7	8	10	12
Dia. Flgs..	--	--	--	--	--	7	7	8 1/2	10	12	13	15	18
Each.....	\$40.	44.	46.	54.	63.	72.	87.	105.	135.	180.	240.	300	450.

## THE "FORD" WATER PRESSURE REGULATOR.

Size....	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	7	8
Each... \$	18.	20.	22.	25.	30.	35.	40.	50.	60.	75.	100.	135.

## THE "FORD" PUMP REGULATOR.

FOR ELEVATOR, HOUSE AND FIRE PUMPS.

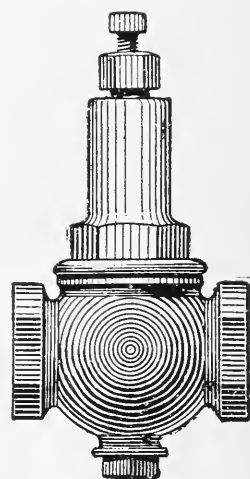
To connect and operate, place the Regulator in an upright position between the steam chest and throttle valve, then connect the steam pipe to the side inlet. The oil cup should be placed in such a position as to allow the oil to pass through the Regulator. For connecting the water part with closed tank (as with elevator pressure systems or fire pumps), tap the pressure tank for 3/8 pipe, and connect the side of operating cylinder (marked inlet). Place a union and globe valve near the Regulator. A drip pipe should be connected with the bottom of the cylinder.

To remove the valve cap, strike the lugs lightly with a hammer.

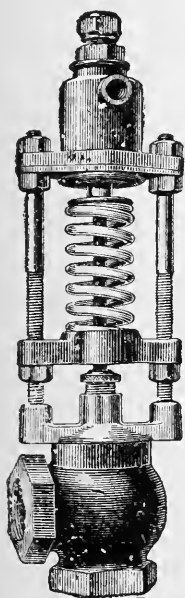
In starting your pumps, do it with throttle valve in steam pipe, then open the globe valve in pressure pipe from tank to Regulator, and screw up the nuts on side rods under the spring rest until the required pressure is obtained.

When used for open tanks connect a float valve to the end of discharge pipe in the tank on the roof; then from the operating cylinder connect a 3/8 pipe to the pump discharge pipe with a valve and union.

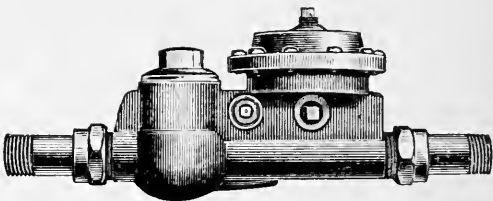
Size.....	1	1 1/2	2	2 1/2	3	4
Each.....	\$20.	25.	30.	35.	40.	50.



Ford  
Water Pressure  
Regulator.



THE  
"GRIFFIN" WATER  
PRESSURE REGULATOR.



In the "Griffin" Water Pressure Reducing Valve, we present a device which we can recommend for its simplicity of construction, durability and absolute safety.

By its use heavy water pressures are automatically reduced and maintained at any point at which the Regulator may be set ; all its parts are frictionless, and there are no packed joints to leak or stick.

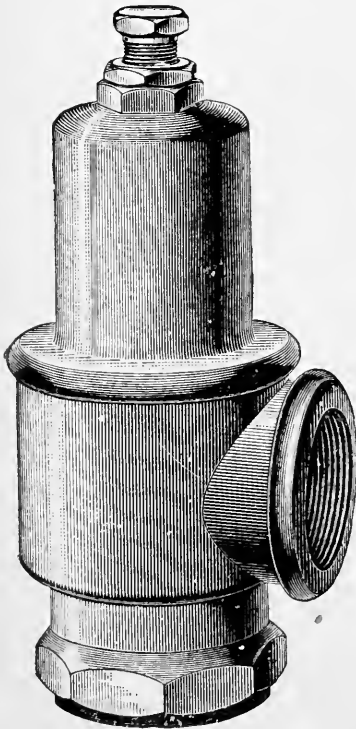
It is not an untried device, having been in the field for several years, and during which time a large number have been placed under the most exacting conditions with perfect results in every instance. By a simple device the full initial pressure can be instantly turned on for fire or other purposes, and can be operated from a long distance, balancing the water on opposite sides of the diaphragm, relieving it from all strain, unlike any other. A bonnet and wheel furnished with 2-inch sizes and above, forms a shut-off globe valve.

This Regulator does not chatter under heavy pressure and full flow ; its use prevents the annoying "water hammer" in house systems, and in case of mains being turned off, or bursting, the valve closes automatically and prevents the collapse of Boilers.

3/4 in. ....	\$15.00	2 in. ....	\$45.00	6 in. ....	\$175.00	14 in. ....	\$500.00
1 " ....	20.00	3 " ....	75.00	8 " ....	250.00	16 " ....	700.00
1 1/2 " ....	30.00	4 " ....	100.00	12 " ....	350.00	20 " ....	1,200.00

In ordering, state highest water pressure and delivery wanted.

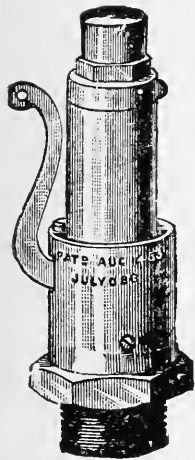
WATER RELIEF VALVE.



This Water Relief Valve is unequalled for strength and efficiency.

Size In.	Diam. Base Flange.	Diam. of Side Outlet.	Brass.	Iron.
3/4	Screwed.	3/4 inch	\$10.00	.....
1	"	1 "	12.00	.....
1 1/4	"	1 1/4 "	15.00	.....
1 1/2	"	1 1/2 "	20.00	.....
2	"	2 "	30.00	\$30.00
2 1/2	"	2 1/2 "	50.00	50.00
2 1/2	Screwed or { 9 } { 9 } { 10 } { 11 } { 11 } { 12 } { 12 } { 14 }	2 1/2 "	.....	50.00
3		3 "	.....	65.00
3 1/2		3 1/2 "	....	80.00
4		4 "	.....	100.00
4 1/2		4 1/2 "	.....	125.00
5		9 "	.....	160.00
5 1/4		10 "	.....	220.00
6		10 "	.....	250.00
		} in. Flange.		
		} Flange		

In ordering, state pressure to be carried.  
If flange is desired, state diameter in ordering.



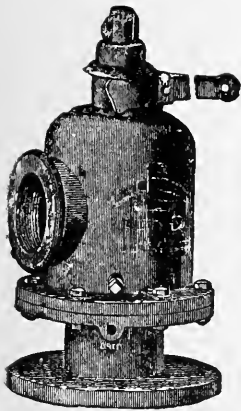
RICHARDSON'S PATENT VALVES,

FOR PORTABLE FARM ENGINES, HOISTING  
ENGINES, STEAM FIRE ENGINES, AND  
STEAM LAUNCHES.

Always connect Valve as close to boiler as possible. When pipe connections to inlet of Valve must be used, then have them full diameter of Valve or larger and as short and free from bends as possible.

In ordering, state horse power or size of boiler, and highest working pressure.

Sizes.	Size Steam Connection.	Height.	Largest Diameter.	Horse Power.	Prices without Locks.
$\frac{3}{4}$ inch.	$\frac{3}{4}$ in., Female.	$6\frac{3}{8}$ inch.	$2\frac{3}{8}$ inch.	8	8.00—Down-turned Levers.
$\frac{3}{4}$ "	1 " Male.	$6\frac{1}{8}$ "	$2\frac{1}{8}$ "	10	8.00— " "
1 "	1 " "	$7\frac{1}{2}$ "	$2\frac{7}{8}$ "	12	10.00—Up-turned Levers.
1 "	$1\frac{1}{4}$ " "	$7\frac{1}{2}$ "	$2\frac{7}{8}$ "	15	10.00— " "
$1\frac{1}{4}$ "	$1\frac{1}{4}$ " "	$7\frac{1}{2}$ "	3 "	18	15.00— " "
$1\frac{1}{4}$ "	$1\frac{1}{2}$ " "	$7\frac{1}{2}$ "	3 "	20	15.00— " "
$1\frac{1}{2}$ "	$1\frac{1}{2}$ " "	$7\frac{3}{8}$ "	$3\frac{3}{8}$ "	20	20.00—Straight Levers.
$1\frac{1}{2}$ "	2 " "	$7\frac{3}{8}$ "	$3\frac{3}{8}$ "	25	20.00— " "
2 "	2 " "	$9\frac{1}{8}$ "	$4\frac{1}{8}$ "	30	30.00— " "
$2\frac{1}{2}$ "	$2\frac{1}{2}$ " Female.	$12\frac{1}{8}$ "	$5\frac{1}{4}$ "	40	40.00— " "
3 "	3 " "	$13\frac{1}{2}$ "	$5\frac{3}{8}$ "	..	.....— " "



SOLID

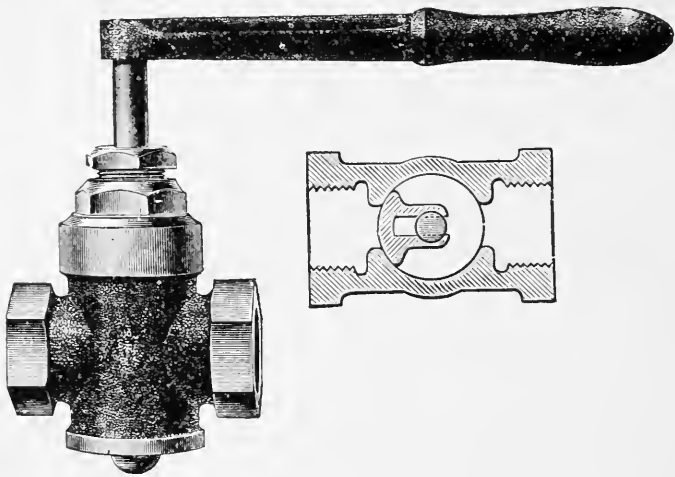
NICKEL SEATED SAFETY VALVES,

WITH ADJUSTABLE SCREW RING.

FOR STATIONARY OR MARINE BOILERS.

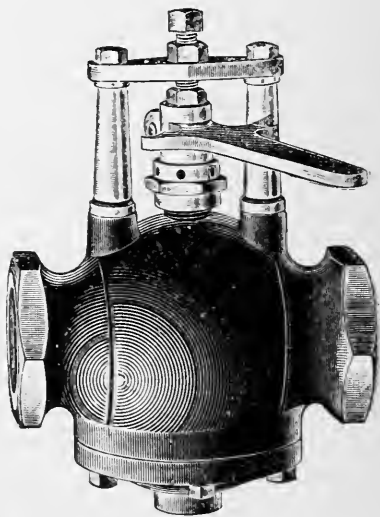
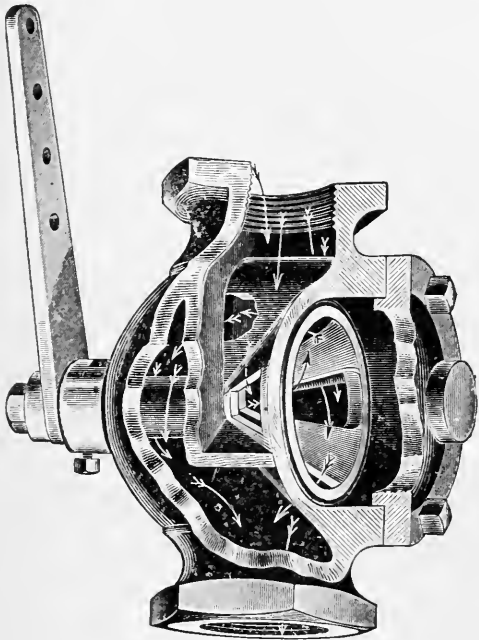
MADE WITH EITHER FLANGED OR SCREW BASE CONNECTION,  
AS ORDERED.

Size.	Diameter of Base Flange.	Diameter of Side Outlet.	Distance from Base Flange to Centre of Side Outlet.	Total Height of Valve, including Lock-up Caps.	Distance from Centre of Valve to Outside of Outlet.	Largest Diameter of Valve or Space Occupied.	For Boilers, H. P.	Prices.
1 inch	Screwed	$1\frac{1}{4}$ in. screw'd	4 inch	$9\frac{7}{8}$ inch	$2\frac{3}{8}$ inch	$4\frac{1}{2}$ inch	8 to 10	15.00
$1\frac{1}{4}$ "	"	$1\frac{1}{2}$ "	$4\frac{11}{16}$ "	$11\frac{1}{8}$ "	$2\frac{3}{8}$ "	5 "	10 to 15	20.00
$1\frac{1}{2}$ "	"	2 "	$5\frac{1}{2}$ "	12 "	$2\frac{7}{8}$ "	$6\frac{1}{4}$ "	20 to 30	30.00
2 "	"	$2\frac{1}{2}$ "	6 "	$14\frac{1}{4}$ "	$3\frac{1}{2}$ "	$7\frac{3}{8}$ "	35 to 50	40.00
$2\frac{1}{2}$ "	$9\frac{1}{8}$ inch	3 "	$7\frac{3}{4}$ "	$17\frac{1}{4}$ "	$4\frac{1}{4}$ "	$8\frac{3}{4}$ "	60 to 75	55.00
3 "	$9\frac{1}{8}$ "	$3\frac{1}{2}$ "	$8\frac{1}{2}$ "	18 "	5 "	$9\frac{3}{8}$ "	75 to 100	75.00
$3\frac{1}{2}$ "	$10\frac{1}{4}$ "	4 "	$9\frac{1}{8}$ "	$20\frac{3}{4}$ "	$5\frac{5}{8}$ "	$10\frac{3}{8}$ "	100 to 125	87.00
4 "	$11\frac{3}{8}$ "	4 "	$9\frac{1}{4}$ "	$21\frac{1}{4}$ "	6 "	$11\frac{1}{8}$ "	125 to 150	100.00
$4\frac{1}{2}$ "	$12\frac{1}{8}$ "	$8\frac{1}{2}$ in. flanged	10 "	22 "	6 "	12 "	150 to 175	125.00
5 "	$13\frac{1}{8}$ "	$9\frac{1}{8}$ "	10 "	23 "	$6\frac{1}{4}$ "	$12\frac{3}{4}$ "	175 to 200	150.00
$5\frac{1}{2}$ "	$13\frac{1}{8}$ "	$10\frac{1}{8}$ "	11 "	36 "	12 "	19 "	200 to 275	165.00
6 "	$13\frac{1}{8}$ "	$10\frac{1}{8}$ "	.....	40 "	$14\frac{3}{4}$ "	$22\frac{1}{4}$ "	.....	175.00



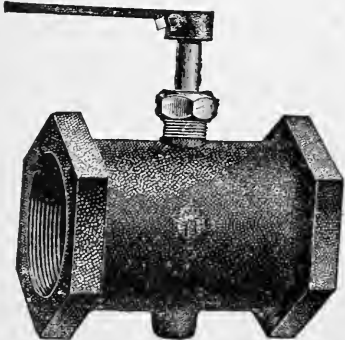
Throttle Valves.

Sizes.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Throttle Valves, Brass Screwed.....	10.00	11.50	14.00	20.00	25.00	35.00	47.00	....	...
Throttle Valves, Iron Screwed.....	....	10.00	12.50	15.00	22.50	30.00	40.00	50.00	60.00
Throttle Valves, Iron Flanged.....	....	11.00	13.50	16.50	24.00	32.00	42.50	53.00	64.00



Fitts' Chronometer Governor Valves.

Size ...	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4	6
Iron Body.....	....	....	5.50	8.00	11.00	15.00	20.00	25.00	35.00	60.00	120.00
Bronze Body.....	....	....	7.00	10.00	14.00	20.00	28.00	37.00	55.00	....	....
Iron Body, with Yoke..	....	....	....	....	15.00	20.00	25.00	33.00	45.00	75.00	150.00
Bronze Body, " " ..	9.00	9.00	10.00	13.00	18.00	25.00	33.00	45.00	65.00	....	....



Butterfly Valves, Iron Body.

Sizes .....	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
Screwed....	6.35	7.00	8.00	9.50	12.00	16.00	18.50	28.50	42.50
Flanged....	7.50	8.50	9.50	11.50	15.00	19.00	22.00	32.00	47.00

Butterfly Valves, Brass.

Sizes.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Screwed....	3.10	4.40	5.65	6.75	10.00	13.75	21.00
Flanged....	....	....	....	14.00	21.00	27.00	42.00

Butterfly Valves.

# LOW PRESSURE BRASS SAFETY VALVES.

FOR STEAM HEATING BOILERS.

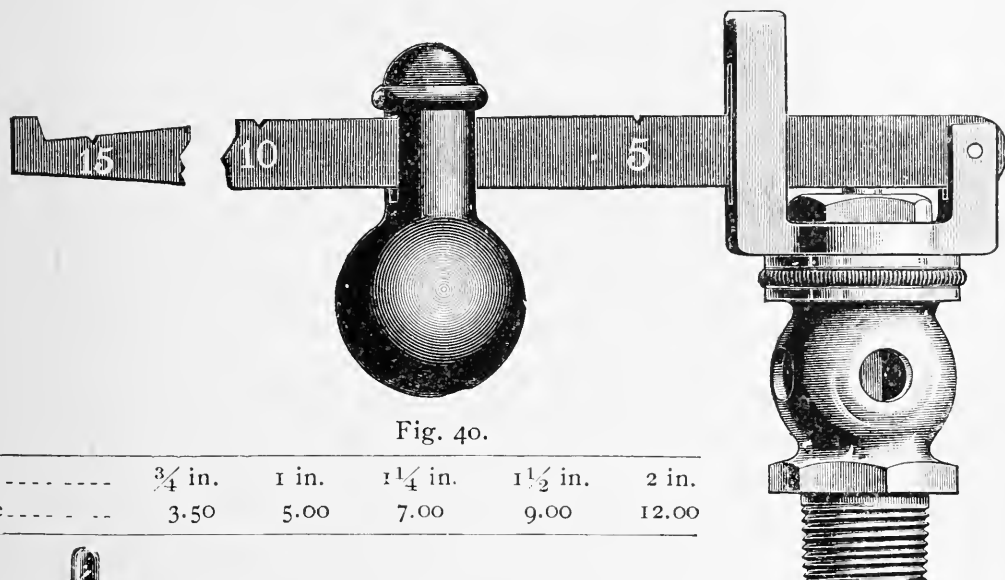


Fig. 40.

Size.....	$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	2 in.
Price.....	3.50	5.00	7.00	9.00	12.00

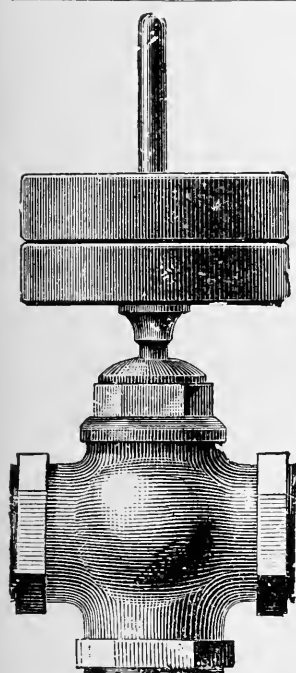
Fig. 40.

## NASON PATTERN.

Size.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Each.....	2.50	3.50	5.00	6.00	8.00
Size.....	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	
Each.....	16.00	20.00	26.00	31.00	

## VACUUM VALVE.

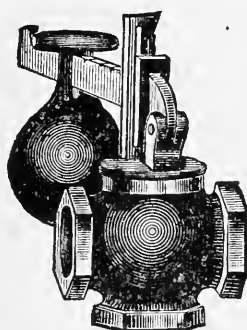
Size.....	$\frac{1}{2}$	$\frac{3}{4}$
Each.....	1.50	2.00



Nason Pattern.



Vacuum  
valv.



## STANDARD PATTERN.

Size.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Safety Valves.	2.20	2.50	3.25	3.90	4.70
Size.....	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Safety Valves.	7.15	9.00	12.50	22.50	33.50

Figs. 337 and 338, Ball Pattern.

Sizes.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Fig. 337.....	1.50	2.25	3.00	4.00	5.50	---
Fig. 338.....	2.25	2.60	3.30	4.50	6.35	8.65



Fig. 337.

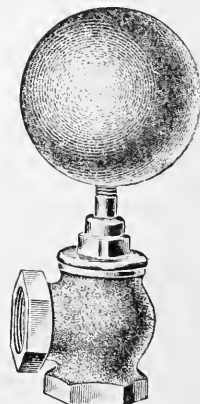


Fig. 338.



LOW PRESSURE POP SAFETY VALVES.

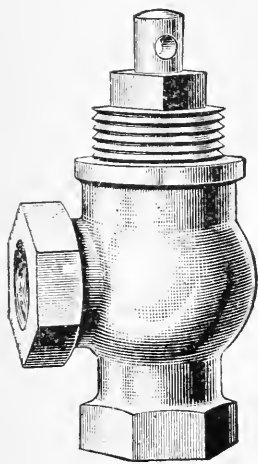


Figure 50.

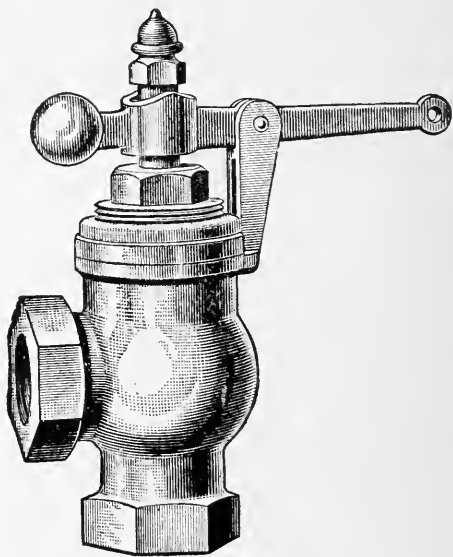


Figure 56.

FIGURE 50.

Size, inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Each.....	\$2.60	\$3.30	\$4.50	\$6.35	\$8.65

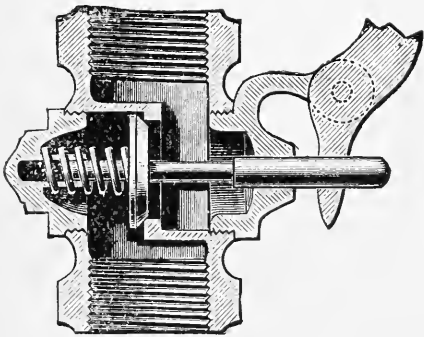
FIGURE 56.

Size, inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Each.....	\$5.00	\$7.00	\$9.00	\$11.00	\$18.00

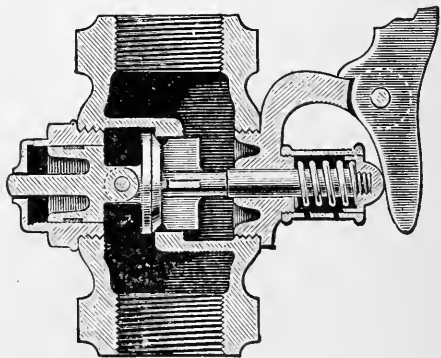
These Valves are made with rough body, bronzed ; also finished, to order only, at a nominal advance in price.

In ordering, state pressure at which Valve is to be set.

WHISTLE VALVES.



Whistle Valve.



Compound Whistle Valve.

WHISTLE VALVES.

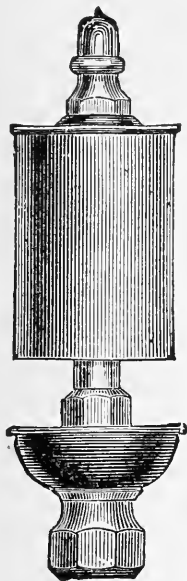
Size.....	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	2 in.	$2\frac{1}{2}$ in.	3 in.
Price.....	\$2.50	\$3.00	\$3.50	\$5.00	\$6.00	\$9.00	\$18.00	\$27.00

COMPOUND WHISTLE VALVES.

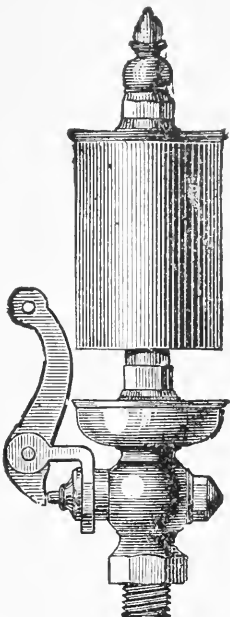
Size.....	2 inches.	$2\frac{1}{2}$ inches.	3 inches.
Price.....	\$25.00	\$35.00	\$45.00

The Compound Automatic Whistle Valve is especially adapted for use where high pressure is carried, as they are opened with the least effort.

STEAM WHISTLES.



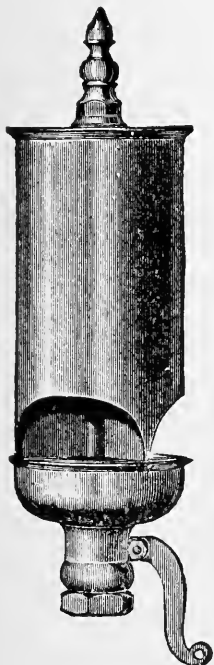
No. 4. Without Valve.



No. 5. With Side Valve.

Diameter of Bell.....	Inch,	1	1¼	1½	2	2½	3	3½	4	5	6	8	10
Screwed for Pipe. . . . .	"	½	½	½	¾	¾	1	1	1¼	1½	2	2½	2½
No. 4. Without Valve...	Each,	2.20	2.75	3.00	4.35	5.25	7.25	9.50	12.00	19.00	24.00	70.00	125.00
No. 5. With Side Valve.	"	3.10	3.75	4.00	5.50	6.50	8.50	11.50	15.00	22.50	33.00	95.00	175.00

SINGLE BELL CHIME WHISTLES.



Upright Valve.



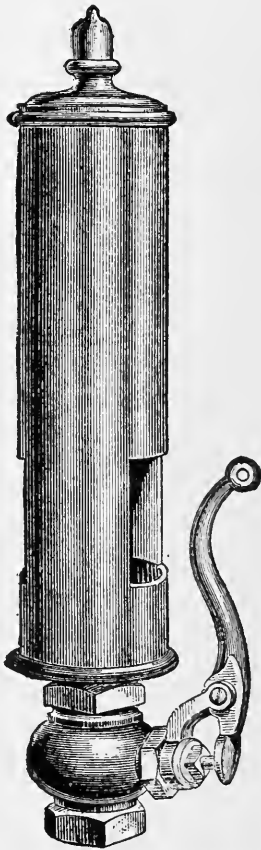
Side Valve.

Diameter of Bell....	Inch,	2	2½	3	4	5	6	8	10	12
Size of Steam Pipe..	"	½	¾	¾	1	1¼	1½	2	2½	3
Without Valve .....	Each,	5.00	7.00	8.00	14.00	22.00	38.00	85.00	150.00	260.00
With Upright Valve	"	....	...	....	18.00	28.00	42.00	....	....	....
With Side Valve....	"	7.00	9.00	11.00	18.00	28.00	42.00	100.00	180.00	300.00

SPECIAL STEAM WHISTLES.



Long Bell Whistle.



Organ Pipe Whistle.

ORGAN PIPE WHISTLE.

The Organ Pipe Whistle, owing to its length and form of bell, has a soft and musical far-reaching sound, and is therefore, in many cases, preferable to the shrill sound of the plain whistle, especially when worked under high pressure. It has been largely adopted by steam launches, etc.

PRICES.

Diameter of Bell, inches .....	1 1/4	1 3/4	2 1/4
Size of Steam Pipe, " .....	1 1/2	1 1/2	1
Price, each .....	\$8.00	10.00	15.00

LONG BELL WHISTLE.

The Long Bell Whistle, owing to its length, has a soft and far-reaching sound, and is therefore preferable to the shrill sound of the plain whistle when operated under high pressure.

They are made in the following sizes :

Diameter of Bell, inches .....	4	5	6	8	10
Size of Steam Pipe, " .....	1	1 1/4	1 1/2	2	2 1/2
Length of Bell .....	Ranging from 16 to 36 inches.				

Prices upon application.

In ordering, state Length and Diameter of Bell.

# STEAM SYRENS.

PATENT APPLIED FOR.

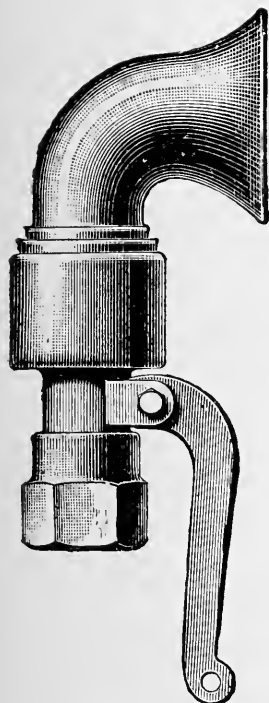


Fig. 18.

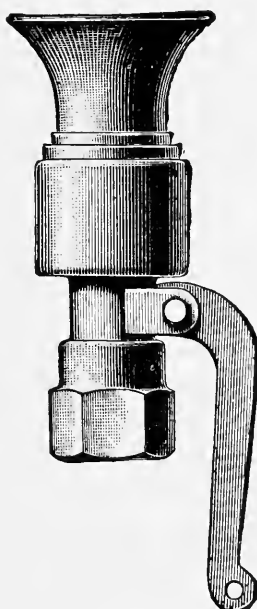


Fig. 17.

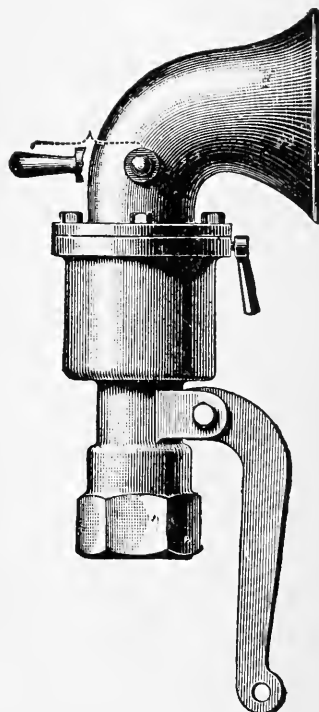


Fig. 19.

These Syrens are specially constructed for use on board steamships, and will be found to possess advantages greatly superior to any other steam sounding or signaling apparatus. The following among other advantages will be readily understood and appreciated.

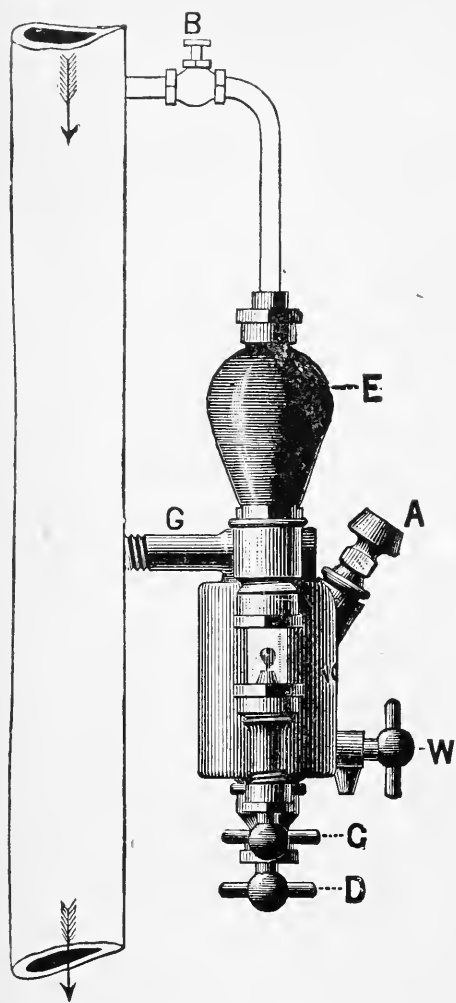
They give the most intense, far-reaching, and distinctive sound yet obtained.

They cannot be over-blown, even with the highest pressure, as is the case with Bell or Organ Pipe Steam Whistles.

With the Fixed Cowl the sound is projected in a horizontal direction; the Syren may be fitted to look forward, so that the most concentrated sound will be projected in the direction of the steamer's course.

With the Movable Cowl the Syren becomes in acoustics what the electrical search-light is in optics, as the sound may be projected horizontally in any required direction.

Size. No.	Connection.	Bellmouth. Fig. 17.	Fixed Cowl. Fig. 18.	Movable Cowl. Fig. 19.	Geared Cowl.
1	¾ inch.	\$15.00	\$20.00	\$25.00	.....
2	1 " "	22.00	27.00	32.00	.....
3	1¼ " "	30.00	35.00	40.00	.....
4	1½ " "	40.00	45.00	50.00	\$60.00
5	2 " "	65.00	75.00	85.00	100.00
6	2½ " "	110.00	125.00	145.00	175.00



THE VOLUNTEER UP-DROP  
SIGHT-FEED LUBRICATOR.

FOR STATIONARY ENGINES AND PUMPS  
OF ALL KINDS.

DIRECTIONS FOR APPLICATION.

1.—Connect the Lubricator to steam pipe by discharge shank G, which is chased for a  $\frac{3}{8}$  in. and  $\frac{1}{2}$  in. pipe, according to size, and also top of condenser to same pipe by  $\frac{1}{4}$  in. pipe, placing a common  $\frac{1}{4}$  in. globe valve at the bend, as illustrated.

2.—The connection between shank G and main steam pipe must be above the throttle, so that pressure will remain on the cup when throttle is closed.

DIRECTIONS FOR USE.

Fill the cup with clean strained oil through filling plug A, then open valves B and D; wait till sight-feed glass has filled with water of condensation, then start and regulate the feed by valve C.

To STOP.—Close valve C.

When the cup is empty close valves C and D, and draw off water by waste-cock W; then fill and start as before, always opening valve D first.

NOTES.

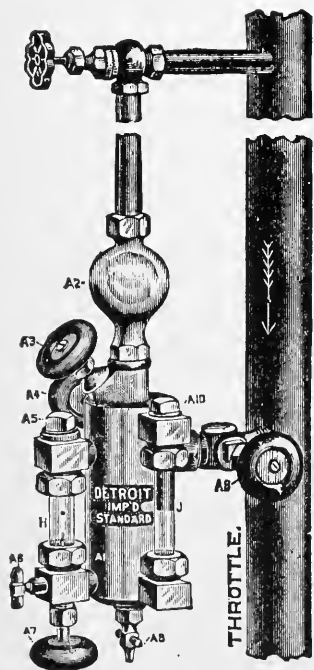
1.—In case the sight-feed glass breaks, close valves B and C and remove the broken glass by unscrewing bonnet of water valve D; at all other times valves B and F must be kept open.

2.—Keep valve D always open, except when draining the cup, as per directions.

Nos. ....	1	2	3
Price. ....	\$10 00	\$12 00	\$15 00
Capacity .....	$\frac{1}{3}$ pt.	$\frac{1}{2}$ pt.	$\frac{2}{3}$ pt.

THE "DETROIT" IMPROVED STANDARD  
LUBRICATOR.

FOR STEAM ENGINES, PUMPS, ETC.



- A1. Body of Oil Reservoir.
- A2. Condenser.
- A3. Filler Plug.
- A4. Water Feed Valve Stem.
- A5. Plug for inserting Sight-Feed Glass.
- A6. Sight-Feed Glass Drain Stem.
- A7. Sight-Feed Regulating Valve Stem.
- A8. Drain Valve.
- A9. Globe Valve in Support Arm.
- A10. Plug for inserting Gauge Glass.
- H. Sight-Feed Glass.
- J. Gauge Glass.
- K. Connection to Steam Pipe.

On account of their small size, the  $\frac{1}{4}$ -pint and  $\frac{1}{2}$ -pin. Improved Standard Lubricators have filler plug above Gauge Glass.

PRICE LIST.

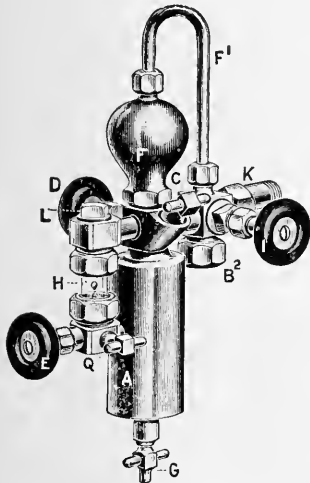
Size.....	$\frac{1}{8}$ Pint	$\frac{1}{2}$ Pint	1 Pint	1 Quart	$\frac{1}{2}$ Gal.	1 Gal.
For Cylinder .....	Under 10 in	10 to 12 in	12 to 18 in	18 to 30 in	30 in & over	
Brass Finish.....	\$17 00	\$22 00	\$30 00	\$45 00	\$60 00	\$75 00
Nickel Finish.....	20 00	25 00	35 00	50 00	65 00	80 00

SIZES OF GLASSES USED.

Sight-Feed.....	$\frac{5}{8} \times 2$	$\frac{3}{4} \times 3$	$\frac{3}{4} \times 3$	$\frac{3}{4} \times 3\frac{1}{4}$	$\frac{3}{4} \times 3\frac{1}{4}$	$\frac{3}{4} \times 3\frac{1}{4}$
Gauge.....	$\frac{5}{8} \times 2$	$\frac{5}{8} \times 3\frac{1}{4}$	$\frac{5}{8} \times 4\frac{3}{8}$	$\frac{5}{8} \times 4\frac{1}{8}$	$\frac{5}{8} \times 6\frac{3}{4}$	$\frac{5}{8} \times 9\frac{3}{4}$

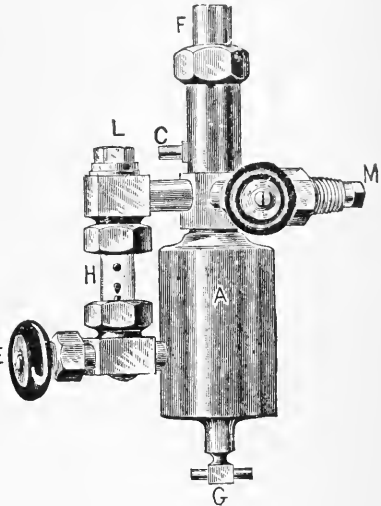
Valve A9 in Support Arm should be in horizontal position as shown in cut when Lubricator is attached to Steam Pipe.

THE DETROIT STYLE "C" LUBRICATORS  
FOR TRACTION ENGINES, STEAM PUMPS, ETC.



Sight-Feed Glass,  $\frac{3}{4} \times 2\frac{1}{8}$ .  
Single Connection.

- A. Oil Reservoir.
- C. Filler Plug.
- D. Water-Feed Valve.
- E. Regulating Valve.
- F. Condensing Chamber. (Single Connection.)
- F. Equalizing Tube. (Single Connection.)
- G. Drain Valve.
- H. Sight-Feed Glass.
- L. Plug to insert Glass.
- K. Connection to Steam Pipe or Steam Chest. (Single Connection.)
- Q. Drain Valve for Sight-Feed Glass.
- I. Valve in Support Arm. (Single Connection.)
- F. Steam Connection. (Double Connection.)
- M. Connection to Steam pipe. (Double Connection.)



Double Connection.

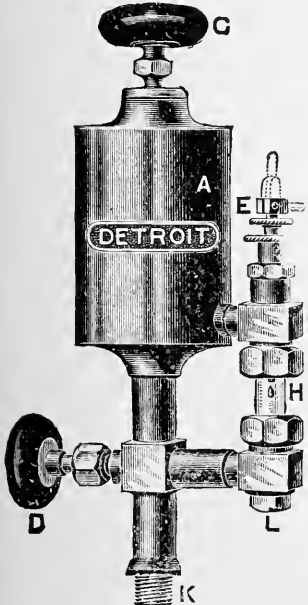
The Single Connection Style "C" Lubricator should be attached to the steam pipe below the throttle or into the steam chest direct.

The Double Connection Style "C" Lubricator should take the steam from the boiler direct, or from steam pipe above throttle, and discharge the oil either into steam pipe below the throttle, or into the steam chest or cylinder. Its construction is such that the oil cannot be siphoned out, and a regular and steady feed is obtained.

Size.....	$\frac{1}{4}$ Pint.	$\frac{1}{3}$ Pint.	$\frac{1}{2}$ Pint.	Pint.	Quart.
Brass Finish, each.....	\$15.00	17.00	20.00	28.00	42.00
Nickel Plated, each.....	18.00	20.00	23.00	32.00	47.00

There are about 6,000 drops of cylinder oil to the pint. Some oil companies claim as many as 6,600 drops per pint. Each Lubricator is tested under 300 lbs. pressure.

DETROIT SIGHT-FEED LUBRICATORS  
FOR GAS AND GASOLINE ENGINES, AIR COMPRESSORS AND AMMONIA CYLINDERS.



Gas Engine and Air Compressor Lubricator.

- A. Oil Reservoir.
- C. Filler Plug.
- D. Valve to control admission of Air.
- E. Feed Valve, with Stop Feed feature.
- H. Sight-Feed Glass.
- K. Connection to Cylinder.
- L. Plug to insert glass.

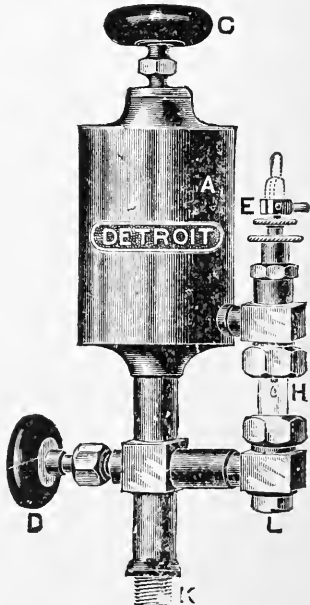
Size of Glass.....  $\frac{5}{8} \times 2\frac{1}{8}$

The Gas Engine and Air Compressor Lubricator is made of the best brass and is connected to the cylinder direct.

For large gas engines and powerful air compressors a specially strong lubricator of this pattern is made.

The "Detroit" Ammonia Cylinder Lubricator is composed of special material which is not affected by the action of Ammonia. It is attached into Ammonia Cylinder Head.

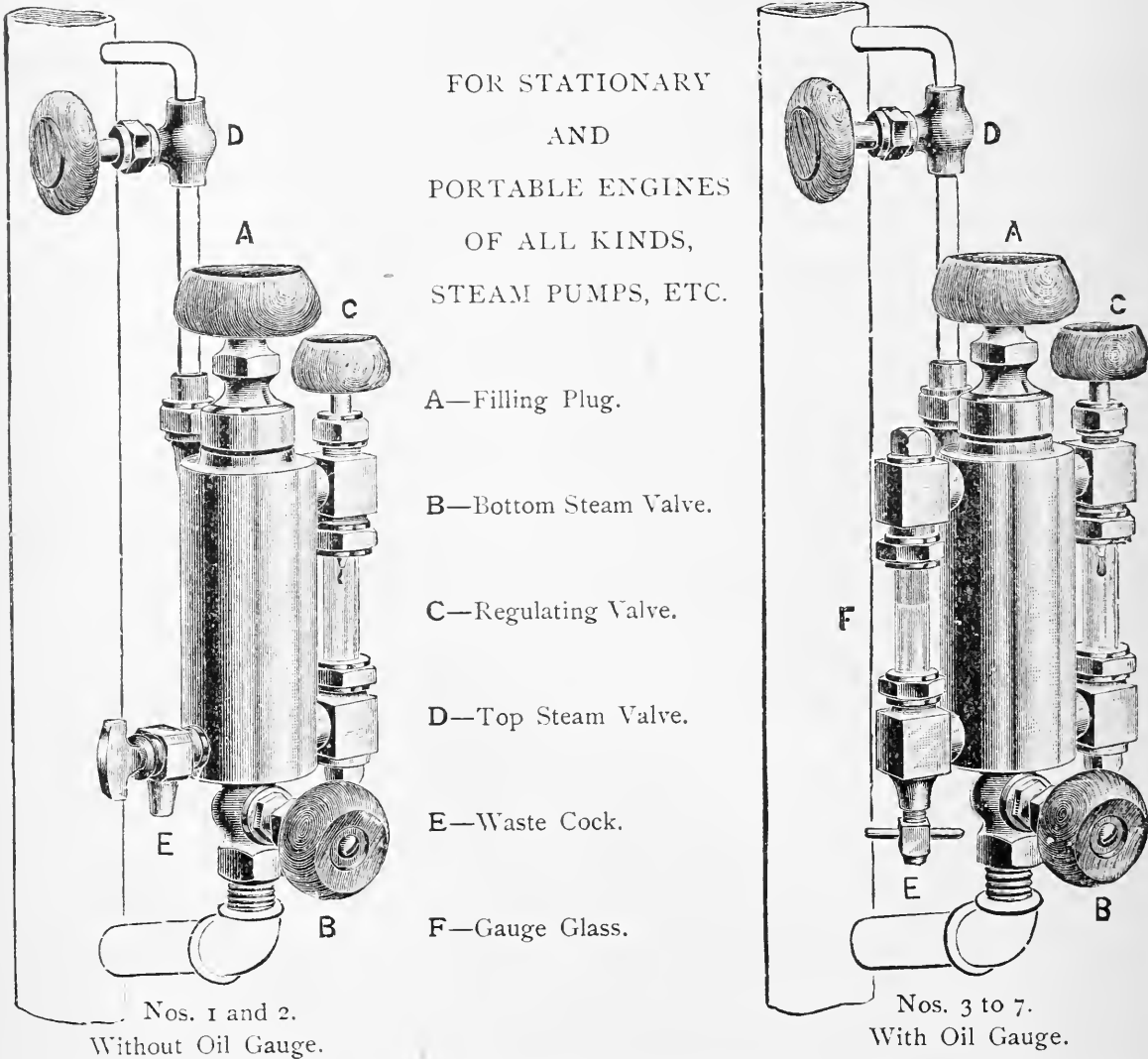
Regulate pressure by Valve D and flow of oil by Valve E. Valve E may be shut off at any time and opened again without disturbing the feed.



Ammonia Cylinder Lubricator.

Size.....	$\frac{1}{4}$ Pint.	$\frac{1}{3}$ Pint.	$\frac{1}{2}$ Pint.	Pint.	Quart.
Bronze Body, Finished Trimmings.....	\$15.00	17.00	20.00	28.00	42.00
Nickel Plated all over.....	18.00	20.00	23.00	32.00	47.00

IMPROVED "HANDY" DROP-FEED LUBRICATORS.



THE SUPPLY OF OIL is propelled through the sight-feed glass by an improved process of steam condensation, and may be regulated to feed fast or slow according to the demands of the engine. The above cuts represent it as applied to the steam pipe, which is the best and most convenient position. Sizes above and including No. 3 are provided with a gauge glass, to show at all times the quantity of oil remaining in the Cup.

DIRECTIONS FOR APPLICATION. Attach the cup to main steam pipe, as close as possible, by a short nipple and elbow at the bottom, taking care the angle does not sag. Connect the valve accompanying the lubricator to the little elbow on top of cup, and to the main steam pipe by 1/8 in. pipe, in the most convenient position.

DIRECTIONS FOR USE.—Fill the cup through filling plug A with clean strained oil. To START:—Open bottom steam valve B, one-half turn, and top steam valve D wide, then after waiting a few minutes, open valve C, when the drop will fall down in sight-feed glass. Regulate the feed by valve C, according to size of engine, but not to exceed 50 drops per minute. To STOP:—Close valves C and B. When the cup is empty, close all valves and draw off condensed water and impurities by waste cock E; then fill and start as before.

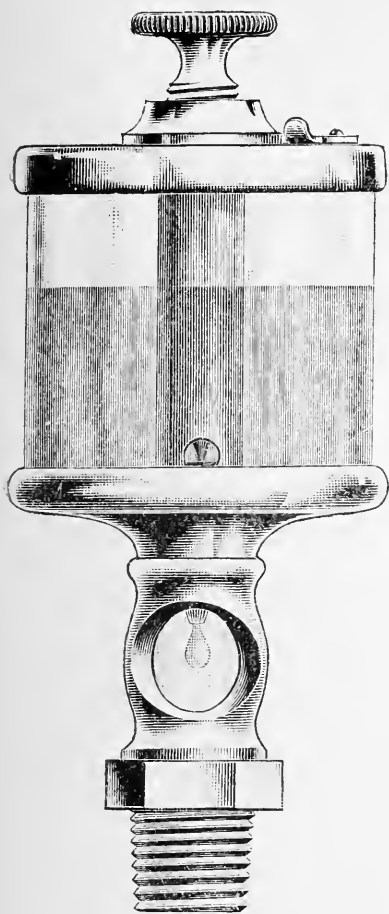
Size.....	No.	1	2	3	4	5	6	7
Approximate Capacity in Pints.....		1/4	1/3	1/2	3/4	1	1 1/2	2
Price with Sight Glass only.....		8.00	10.00	....	....	....	....	...
Price with Sight and Oil Gauge Glass		....	....	14.00	16.00	18.00	24.00	30.00



PLAIN TAPER SCREW ENGINE OILERS.

WITH SIGHT FEED.—SKELETON FRAME.

This style of Cup is made with openings in Ball Shanks, protected by glass, to show the oil drop as it leaves the Cup. This enables the engineer to see the progress of feeding, and regulate flow according to the required demand. They are further provided with an opening in the top, having a movable cover, through which they may be filled, and which also acts when shut (which it should always be, except in the act of filling) as a vent sufficient to keep a proper degree of circulation of air in the Cup to make the pressure uniform and facilitate the flow of oil.



SERIES 160.

TAPER SCREW, FILLING HOLE AND BALL SHANK SIGHT FEED.

No.	Height of Cup Complete. Inches.	Width of Cup Complete. Inches.	Capacity in Ounces.	Size of Shank Pipe Thread. Inches.	Price, Per Dozen.
164	4 1/4	1 3/4	1	1/4	13.00
165	4 7/8	1 7/8	1 1/2	1/4	15.00
166	5 3/8	2 1/8	2	3/8	17.00
167	5 3/8	2 1/2	4	3/8	20.00
168	6 3/4	2 7/8	6	3/8	24.00
169	7 1/4	3 3/8	10	1/2	32.00
170	7 3/4	3 3/4	15	1/2	44.00
171	8 1/2	4 1/4	24	1/2	60.00
172	9 1/4	4 7/8	36	1/2	96.00

NICKEL-PLATED OILERS.

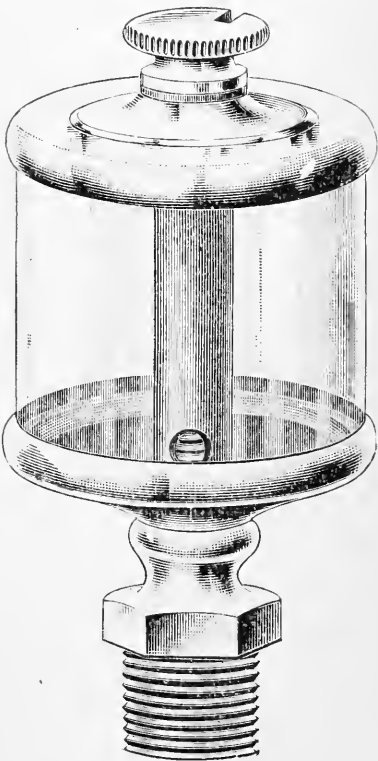
SKELETON FRAME. FOR SHAFTING AND ENGINES.

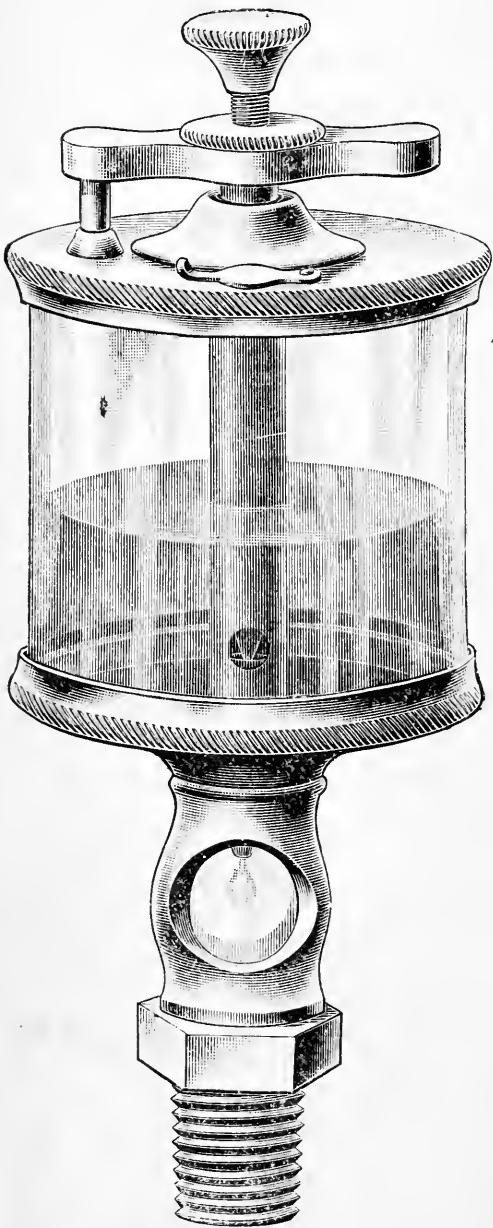
In these Cups the supply of oil is regulated by means of a graduating slotted heavy brass wire, and is capable of being increased or diminished with the utmost precision by adjusting this wire, which extends upward through the centre of the cup, and is easily reached by removing the knob. A slot in the knob enables the latter to be used as a wrench, to adjust the regulating screw to the desired point. This most convenient device has been patented, and cannot be applied to any oil cups except those we manufacture, without liability for infringement of patent.

SERIES 120.

SLOTTED SCREW FEED.

No.	Height of Cup Complete. Inches.	Width of Cup Complete. Inches.	Capacity in Ounces.	Size of Shank Pipe Thread. Inches.	Price, Per Dozen.
121	2 3/4	1 1/8	1/4	1/8	8.00
122	3	1 1/4	3/8	1/8	9.00
123	3 1/4	1 3/8	1/2	1/8	10.00
124	3 3/4	1 3/4	1	1/4	11.00
125	4	1 7/8	1 1/2	1/4	12.00
126	4 1/8	2 1/8	2	3/8	14.00
127	4 3/4	2 1/2	4	3/8	17.00
128	5 3/4	2 7/8	6	3/8	21.00
129	6 1/4	3 3/8	10	1/2	27.00
130	6 3/4	3 3/4	15	1/2	36.00
131	7 1/2	4 1/4	24	1/2	54.00
132	8 1/4	4 7/8	36	1/2	84.00





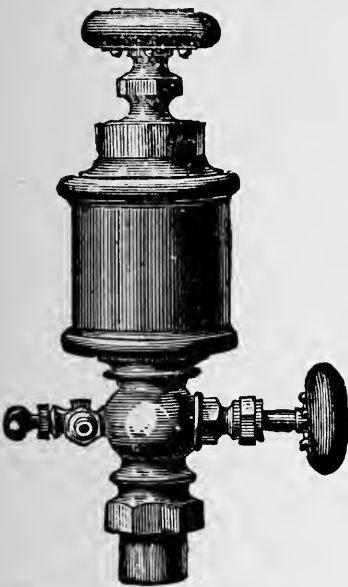
NICKEL-PLATED STOP  
AND SIGHT FEED OILERS.

SKELETON FRAME.

In these Cups the feed is controlled by the Regulating Screw in the top Cross-bar, and may be set to any desired rate by means of the small lock nut on same. The supply of oil can be shut off, or turned on instantly, without disturbing the rate of feed by the seating and unseating of the Regulating Screw in the socket on top of the Cup. They are also provided with Ball Shank Sight Feed Openings protected by glass, through which the flow of oil is visible at all times, and a filling hole in the top of the Cup fitted with a movable cover which acts at the same time as a ventilator to keep up a proper circulation of air in the Oil Chamber.

SERIES 180.  
STOP AND SIGHT FEED.

No.	Height of Cup, Complete. Inches.	Width of Cup, Complete. Inches.	Capacity in Ounces.	Size of Shank Pipe Thread. Inches.	Price per Dozen.
184	4 <sup>3</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>4</sub>	1	1/ <sub>4</sub>	18.00
185	5	1 <sup>7</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	1/ <sub>4</sub>	21.00
186	5 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>8</sub>	2	3/ <sub>8</sub>	24.00
187	5 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	4	3/ <sub>8</sub>	27.00
188	6 <sup>3</sup> / <sub>4</sub>	2 <sup>7</sup> / <sub>8</sub>	6	3/ <sub>8</sub>	32.00
189	7 <sup>1</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>8</sub>	10	1/ <sub>2</sub>	40.00
190	7 <sup>3</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>4</sub>	15	1/ <sub>2</sub>	54.00
191	8 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>4</sub>	24	1/ <sub>2</sub>	84.00
192	9 <sup>1</sup> / <sub>4</sub>	4 <sup>7</sup> / <sub>8</sub>	36	1/ <sub>2</sub>	120.00



NATHAN'S PATENT  
SELF-ACTING LUBRICATORS.

FOR STEAM CHESTS AND CYLINDERS OF ALL  
KINDS AND SIZES.

Size, Inches.	Capacity, Pints.	Plain, No Yoke, Each.	With Yoke.
1	$\frac{1}{16}$	\$3.00	-----
1½	$\frac{1}{8}$	4.50	-----
2	$\frac{1}{4}$	6.00	-----
2½	$\frac{1}{2}$	8.00	-----
3	$\frac{3}{4}$	10.00	16.00
3½	1	13.00	-----
4	2	16.00	24.00
5	3	-----	33.00
6	5	-----	42.00
7	7	-----	54.00

LUNKENHEIMER GREASE AND OIL CUPS.

BRASS HINGE LID OIL CUPS.



Fig. 510,  
Ideal Grease Cup.

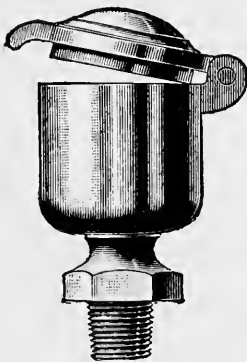


Fig. 538, Small Base  
Oil Cup.

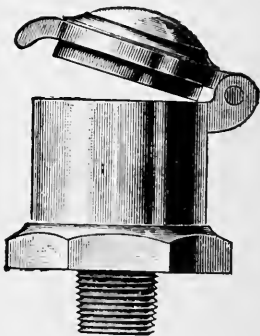


Fig. 539, Large Base  
Oil Cup.

SIZES AND PRICES IDEAL GREASE CUP, FIG. 510.

Number	00	0	1	2	3	4
Inside Diameter.....inches	1	1¼	1½	2	2½	3
Pipe Thread.....inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Capacity (Grease).....ounces	$\frac{1}{3}$	1	1½	3	6	10
Finished Brass.....each	1.50	2.00	2.50	3.20	4.30	6.00
Nickel-Plated.....each	1.75	2.25	2.80	3.60	5.00	6.75

SIZES AND PRICES BRASS HINGE LID OIL CUP. FIGS. 538 AND 539.

Number	1	2	3	4	5	6	7
Outside Diameter.....inches	$\frac{7}{8}$	1	1¼	1½	1¾	1¾	2
Shank Pipe Thread.....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$
Finished Brass.....each	.70	.85	1.20	1.60	2.10	2.50	2.70
Add to List for Brass Tubes.....	.10	.10	.15	.15	.15	.15	.15

PLAIN OIL CUP AND COMMON LUBRICATOR.



PLAIN OIL CUP.

PLAIN OIL CUPS.

Number.....	00	0	1	2	3	4	5
Diameter of Cup, in.	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$
Iron Pipe Thread, in.	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{3}{8}$
Each.....	\$0.25	.30	.35	.40	.50	.60	.90

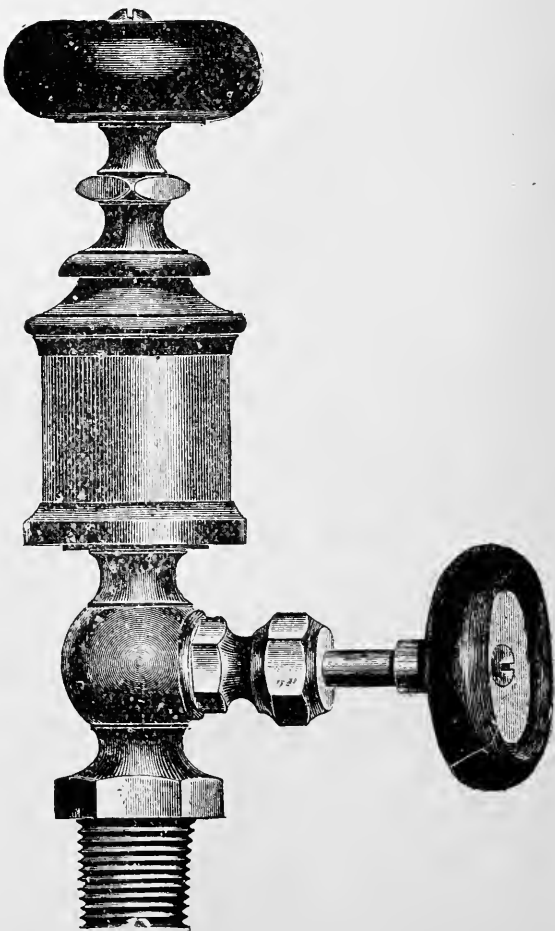
Number.....	6	7	8	9
Diameter of Cup, in. . .	$1\frac{3}{4}$	2	$2\frac{1}{4}$	$2\frac{3}{4}$
Iron Pipe Thread, in...	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$
Each.....	\$1.25	1.75	2.25	3.50

COMMON LUBRICATORS.

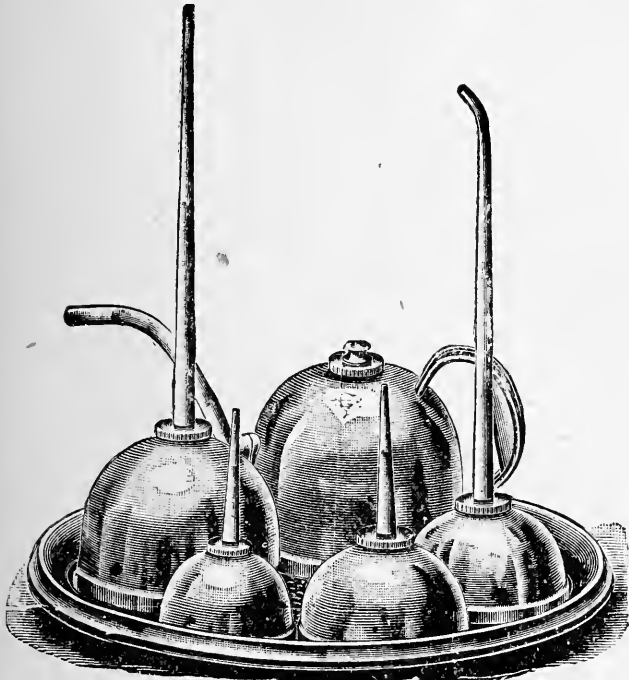
Number.....	1	2	3	4	5	6
Diameter of Cup, in.	1	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
Iron Pipe Thread, in.	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Each.....	\$2.00	2.20	2.30	2.40	2.60	2.90

Number.....	7	8	9	10	11	12
Diameter of Cup, in.	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Iron Pipe Thread, in.	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
Each.....	\$3.10	3.25	3.75	4.75	7.00	10.00



OILER SETS AND OILERS.



Engineers' Set, Copperized Steel.

WITH ROUND TRAY.

No.						Per Set.
30.	Five Pieces, Copperized Steel (Counting Tray)---					6.00
40.	Six	"	"	"	"	9 00
50.	Five	"	Nickel-Plated	"	"	8.00
60.	Six	"	"	"	"	11.00

WITH OVAL TRAY.

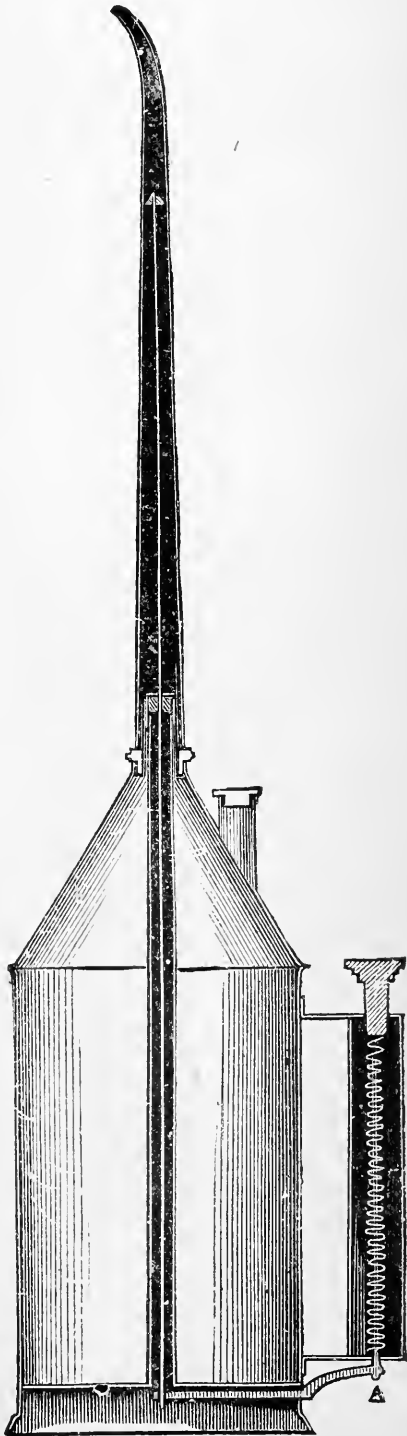
35	Five Pieces, Copperized Steel (Counting Tray)---	7.00
45.	Six	10.00
55.	Five	8 00
65.	Six	11.00

One Set in a Box. Order by Number.

ENGINEERS' OILER,  
AMERICAN PATTERN,  
With Stop Valve in Spout.

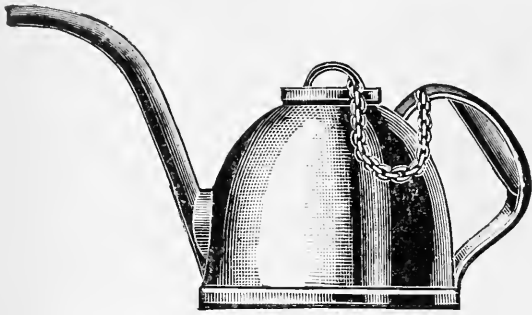
		Per Dozen.
1	Pint, Brass, with Valve-----	36.00
2	" " " "-----	48.00
3	" " " "-----	60.00
1	" " No "-----	24.00
2	" " " "-----	36.00
3	" " " "-----	48.00
1	" Tin, with "-----	24.00
2	" " " "-----	33.00
3	" " " "-----	45.00
1	" " No "-----	12.00
2	" " " "-----	21.00
3	" " " "-----	33.00
1	" Brass, with "-----	36.00

AMERICAN PATTERN.

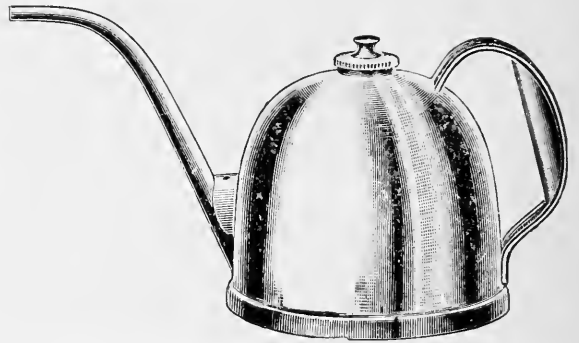


Engineers' Oiler.

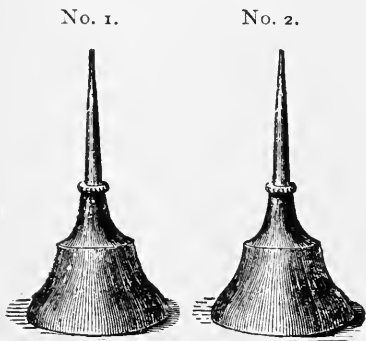
OILERS AND FILLERS.



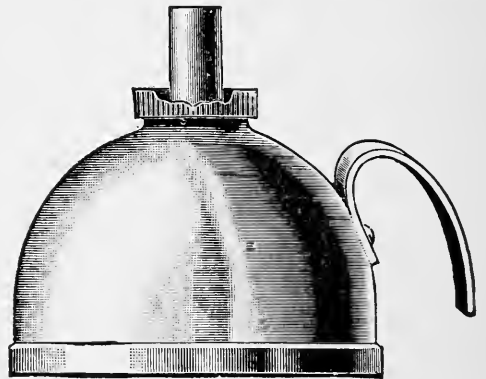
STEEL TALLOW POT No. 212.



ENGINEERS' STEEL FILLER No. 19.



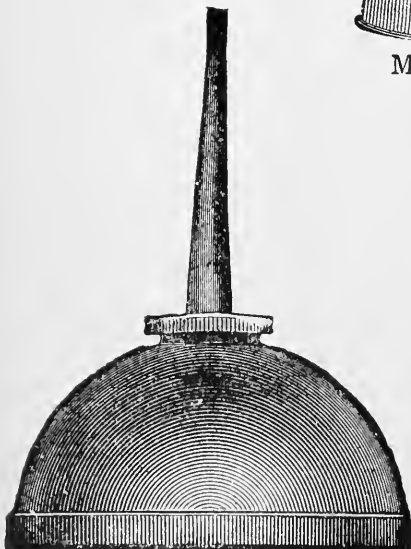
MALLEABLE OILERS.



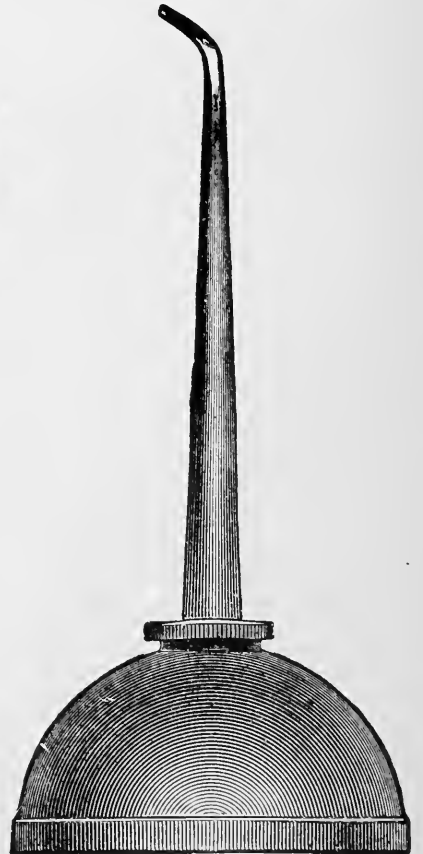
STEEL JACKET LAMP No. 20.



MALLEABLE HAND LAMP.



No. 14A.



No. 14B.

FOR LIST PRICES

SEE NEXT PAGE.

## OILERS AND FILLERS.

### ENGINEERS' STEEL FILLER No. 19.

	Per Doz.
No. 19. 1-pint Copperized Steel Fillers, $4\frac{1}{8}$ inch diameter, $3\frac{1}{2}$ inch high, Screw Top.....	\$14.00
No. 19A. $1\frac{1}{2}$ -pint Copperized Steel Fillers, $4\frac{3}{4}$ inch diameter, 4 inch high, Screw Top.....	17.00
No. 210. 1-quart Copperized Steel Fillers, 5 inch diameter, 5 inch high, Screw Top.....	20.00
No. 211. 2-quart Copperized Steel Fillers, 6 inch diameter, 6 inch high, Screw Top.....	24.00
No. 190. $1\frac{1}{2}$ -pint Nickel Plated Fillers, $4\frac{3}{4}$ inch diameter, 4 inch high, Screw Top.....	22.00
No. 200. 1-quart Nickel Plated Fillers, 5 inch diameter, 5 inch high, Screw Top.....	30.00
No. 201. 2-quart Nickel-plated Fillers, 6 inch diameter, 6 inch high, Screw Top.....	34.00

### STEEL TALLOW POT No. 212.

	Per Doz.
No. 212. 1 qt. Copperized Steel Tallow Pots, 5 in. diameter, 5 in. high.	\$21.00
No. 213. 2-qt. " " " " 6 in. " 6 in. "	25.00
No. 214. 1-qt. Nickel-Plated " " " 5 in. " 5 in. "	32.00
No. 215. 2-qt. " " " " 6 in. " 6 in. "	36.00

### STEEL JACKET LAMP No. 20.

	Per Doz.
No. 20. $3\frac{3}{8}$ inch diameter.....	\$6.00
No. 20 $\frac{1}{2}$ . $3\frac{3}{4}$ " ".....	9.00
No. 21. $4\frac{1}{8}$ " ".....	12.00

### MALLEABLE OILERS.

No. ....	1	2	3
Per Doz.....	\$3.60	\$4.00	\$4.40
Extra Tubes.....		\$1.80.	

### HAND LAMP.

$\frac{1}{2}$ -pint, Tin, per doz.....	\$4.00	$\frac{1}{2}$ -pint Galv'd Iron, per doz..	\$5.00
1 " " " ".....	7.00	1 " " " ".....	8.00
$\frac{1}{2}$ " Brass, " ".....	6.00	$\frac{1}{2}$ " Malleable " ".....	5.00
1 " " " ".....	10.00	Extra Burners.....	.50

### STEEL OILERS.

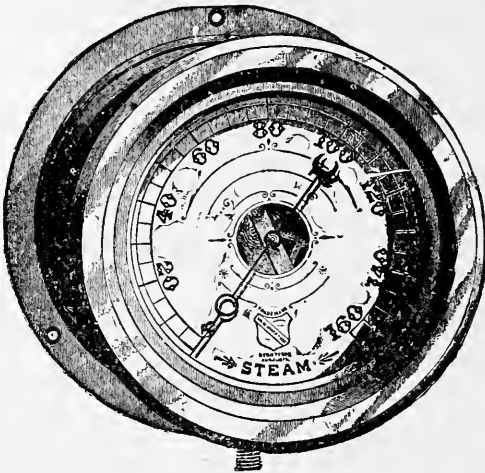
#### No. 14A AND No. 14B WITH IMPROVED STEEL SPRING BOTTOM.

	Per Doz.
No. 14A. Steel Oiler, $3\frac{3}{4}$ inch diameter, 3 inch nozzle.....	\$7.50
No. 14AA. " " $3\frac{3}{4}$ " " 5 " ".....	8.00
No. 14B. " " $3\frac{3}{4}$ " " 9 " ".....	8.50
No. 15. " " $4\frac{1}{8}$ " " 3 " ".....	9.25
No. 15A. " " $4\frac{1}{8}$ " " 5 " ".....	9.75
No. 16. " " $4\frac{1}{8}$ " " 9 " ".....	10.50
No. 140A. Nickel-Plated Oilers, $3\frac{3}{4}$ inch diameter, 3 inch nozzle....	10.00
No. 140AA. " " " $3\frac{3}{4}$ " " 5 " ".....	10.75
No. 140B. " " " $3\frac{3}{4}$ " " 9 " ".....	11.25
No. 150. " " " $4\frac{1}{8}$ " " 3 " ".....	12.00
No. 150A. " " " $4\frac{1}{8}$ " " 5 " ".....	13.00
No. 160. " " " $4\frac{1}{8}$ " " 9 " ".....	14.00

Order by numbers where specified.



STEAM GAUGES.

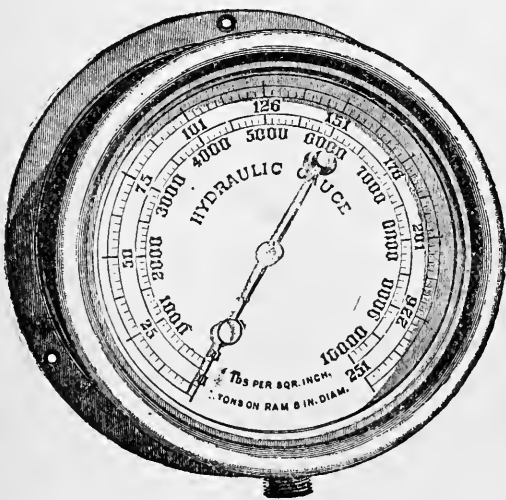


STEAM GAUGES.—BOURDON SPRING.

Size.	Iron Case, Brass Ring.	Iron Case, N. P. Ring.	Brass Case.	N. P. Case.	Brass Deep Case, O. G. or Oct. Ring.	N. P. Deep Case O. G. or Oct. Ring.
12 inch Dial	50.00	51.50	75.00	79.00	80.00	84.00
10 " "	32.00	33.00	40.00	43.00	44.00	47.00
8 1/2 " "	22.00	22.75	30.00	32.50	33.50	36.00
6 3/4 " "	16.00	16.60	20.00	22.00	23.00	25.00
6 " "	13.00	13.50	16.00	17.50		
5 1/2 " "	10.00	10.25	12.00	13.25		
5 " "	8.00	8.20	11.00	12.00		
4 1/2 " "	8.00	8.20	10.00	11.00		
3 1/2 " "	7.00	7.18	9.00	9.75		
3 " "	6.00	6.15	8.00	8.60		

These Gauges must be connected by Syphon.

HYDRAULIC GAUGES.  
SPECIAL STEEL TUBE FOR HIGH PRESSURES.



BRASS CASE.	
12 inch Dial	\$125.00
10 " "	100.00
8 1/2 " "	80.00
6 3/4 " "	60.00
6 " "	40.00
IRON CASE, BRASS RING.	
12 inch Dial	\$110.00
10 " "	90.00
8 1/2 " "	70.00
6 3/4 " "	50.00
6 " "	35.00

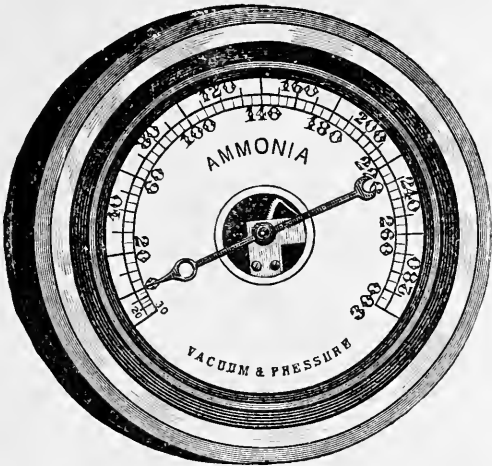
No extra charge for marking tons on dials.  
Nickel Plating extra.  
Hydraulic Check Valves and Cocks extra.

Hydraulic Cock for Gauge	\$8.00
" Check Valve for Gauge	6.00

In ordering, state maximum pressure required.  
If dial is to show pressure in tons on ram, give exact diameter of ram.  
With independent maximum pressure registering hand, \$5.00 extra, net.

AMMONIA GAUGE.

SPRINGS OF  
SOLID BAR STEEL.

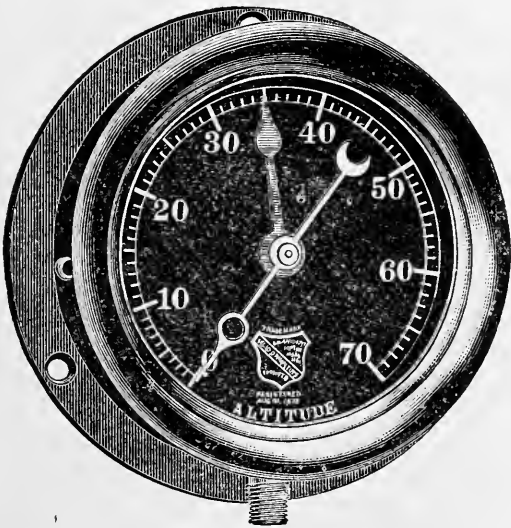


VACUUM AND  
PRESSURE.

FOR AMMONIA, ACID OR OTHER LIQUIDS OR GASES THAT MUST BE KEPT FROM  
CONTACT WITH BRASS.

Sizes.	Iron Case and Ring.	Iron Case, N. P. Ring
8½-inch Dial.....	\$45.00	\$45.75
6¾ " ".....	40.00	40.60
6 " ".....	35.00	35.50
5½ " ".....	30.00	30.50
4½ " ".....	25.00	25.50

ALTITUDE GAUGE.



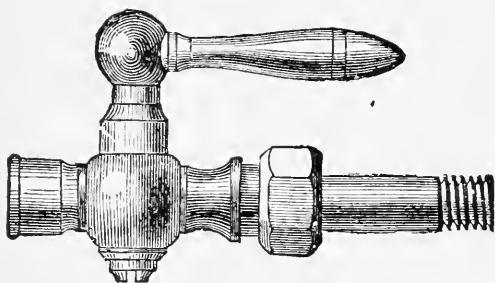
FOR INDICATING HEIGHT OF WATER COLUMN IN FEET.

Sizes.	Iron Case, Brass Ring.	Iron Case, N. P. Ring
4½ or 5 inch Dial, including Cock.....	\$12.00	\$12.20
5½ " " " ".....	14.00	14.25
6 " " " ".....	16.00	16.50

This gauge is for use on hot water heaters to determine the height of the column of water in the reservoir. The red hand can be set at the height at which the water should stand in the reservoir. The white hand, operated by the gauge spring, denotes at all times the height of the water in the reservoir. These gauges do not requite a siphon.

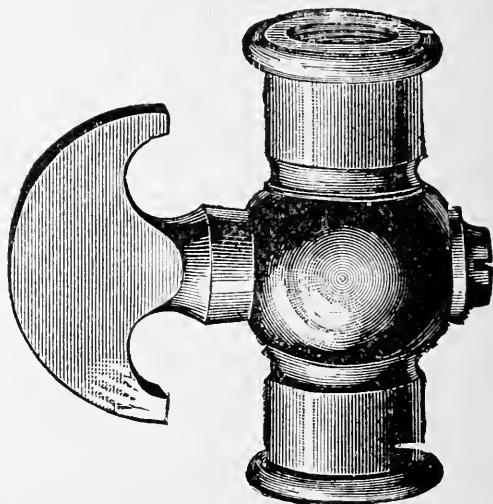
# STEAM GAUGE APPLIANCES AND FUSIBLE PLUGS.

## GAUGE COCKS.



With Union, Lever Handle.

Size .....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$
Each .....	\$1.75	1.90	2.00



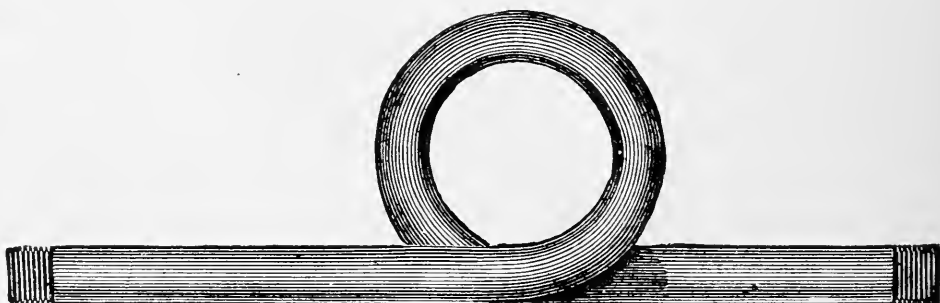
GAUGE COCK, T HANDLE.

Brass, each .....	\$1.00
N. P., " .....	1.50

Small Brass .....	\$0.50	N. P. ....	\$0.75
Large " .....	1.00	N. P. ....	1.50

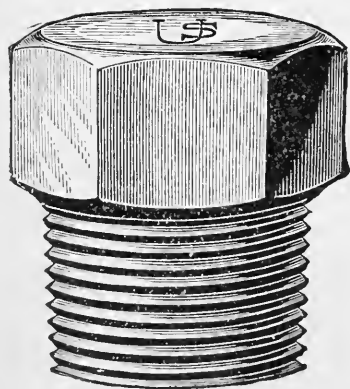


GAUGE SIPHON.

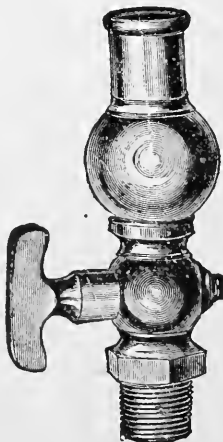


Iron Pipe Siphon...	\$0.50	Brass Pipe Siphon...	\$1.00	N. P. ....	\$1.50
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## FUSIBLE PLUG.

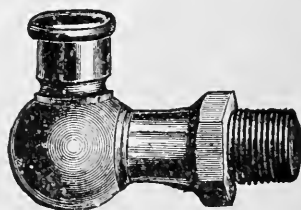


Size, $\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Each, \$0.30	.35	.50	.75	1.00



STRAIGHT SIPHON,  
With Cock.

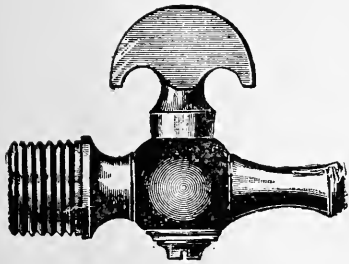
Brass .....	\$1.50
N. P. ....	2.00



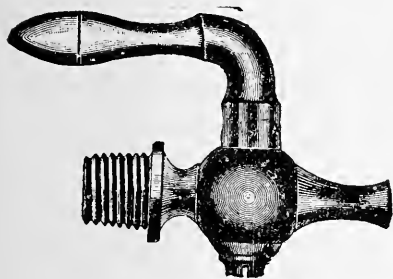
ELBOW SIPHON.

Brass .....	\$1.25
N. P. ....	1.75

AIR COCKS.



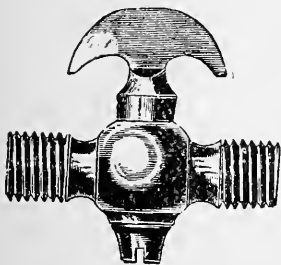
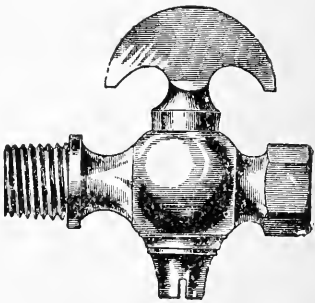
Iron Pipe Thread, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Finished, each.....	\$0.40	.40	.50	.60



LEVER HANDLE.

Size.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Finished, each.....	\$0.55	.55	.65	.75

Size, inch .....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$
Finished, each.....	\$0 75	.85	.95
Male and Female Thread.			
With Lever Handle.....	.90	1.00	1.10



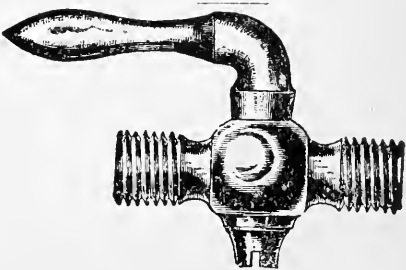
Size, inch.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Finished, each .....	\$0.55	.55	.65	.90

Male Thread both ends.

LEVER HANDLE.

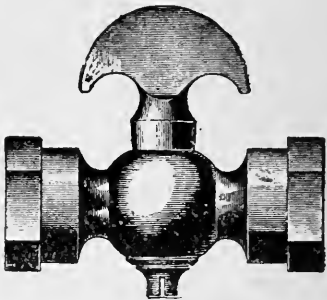
Male Thread both ends.

Size.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Finished, each .....	\$0.60	.70	.85	1.00



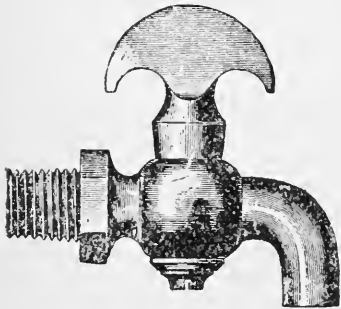
AIR AND CYLINDER COCKS.

Size.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$
Finished, each.....	.75	.85	.95
Female thread both ends.			
With Lever Handle.....	.90	1.00	1.10

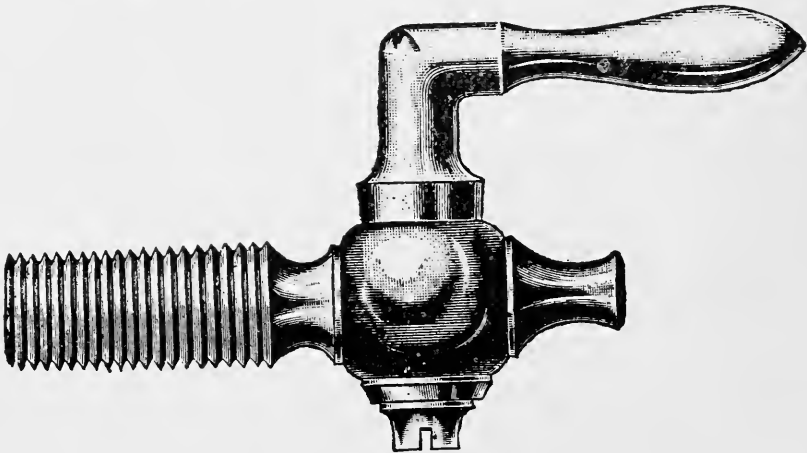


BIBB AIR COCK.

Size.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Finished, each, T Handle.....	.70	.70	.80	.90
With Lever Handle.....	.80	.80	.90	1.00

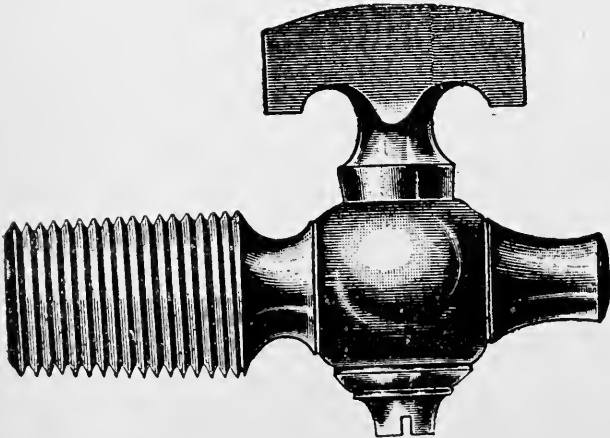


CYLINDER COCKS.



LEVER HANDLE.

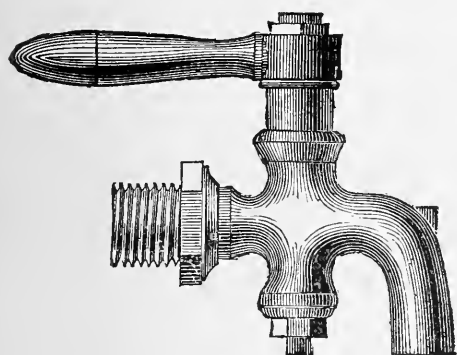
Size.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Each, finished.....	.85	.95	1.05	1.35



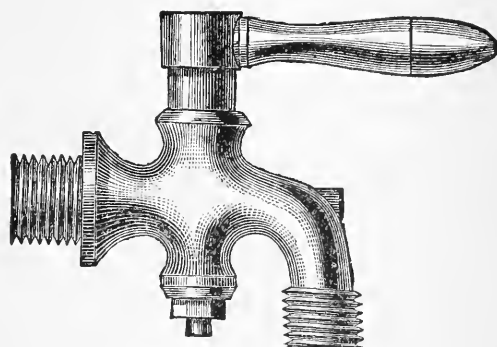
TEE HANDLE.

Size.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Each, finished..	.70	.80	.90	1.20

# STEAM BIBBS, STOPS AND SWING JOINTS.



Steam Bibb for Iron Pipe.



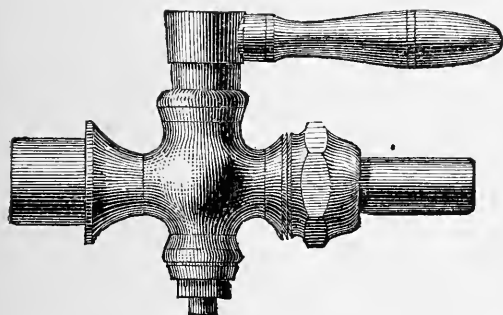
Steam Bibb, Screw Nozzle.

## STEAM BIBBS.

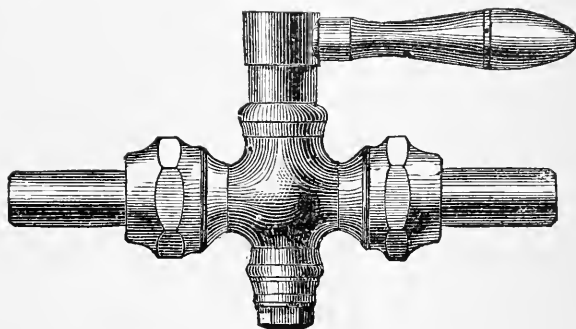
Size	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Finished, per doz	15.00	18.00	24.00	27.00	36.	54.	---	---	---	---
Rough	12.00	15.00	18.00	21.00	30.	42.	60.	96.	180.	300.

## STEAM BIBBS—SCREW NOZZLE.

Size	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Finished, per doz	17.00	20.00	27.00	30.00	39.00	57.00
Rough	14.00	17.00	24.00	27.00	36.00	54.00



Steam Stops, Single Coupling.



Steam Stops, Double Coupling.

## STEAM STOPS—SINGLE COUPLINGS.

Size	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Finished, per doz	21.00	24.00	30.00	36.00	45.00	72.	108.	168.	250.
Rough,	18.00	21.00	24.00	30.00	39.00	60.	96.	144.	215.

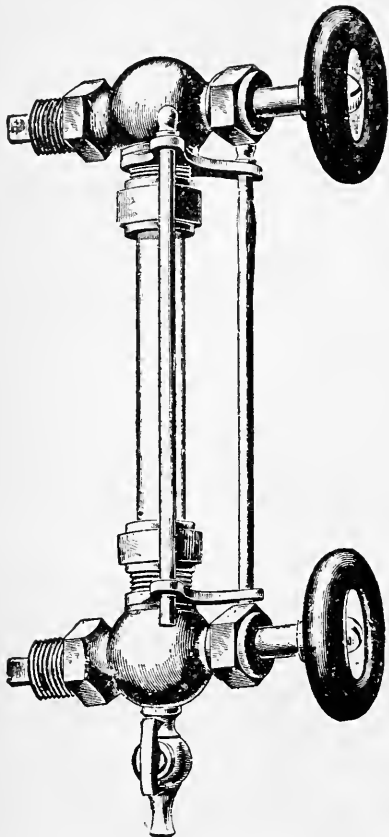
## STEAM STOPS—DOUBLE COUPLINGS.

Size	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Finished, per doz	24.00	27.00	36.00	42.00	51.00	84.	120.	192.	280.
Rough,	21.00	24.00	30.00	36.00	45.00	72.	108.	168.	240.



## STEAM SWING JOINTS.

Size	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Price	1.00	1.25	1.75	2.40	3.50	4.50	6.25	9.00	22.00



No. 0.

SELF-CLEANING WATER GAUGES.

No. 0.

Round Body, Polished, with two Guards,  
Wood Wheel.

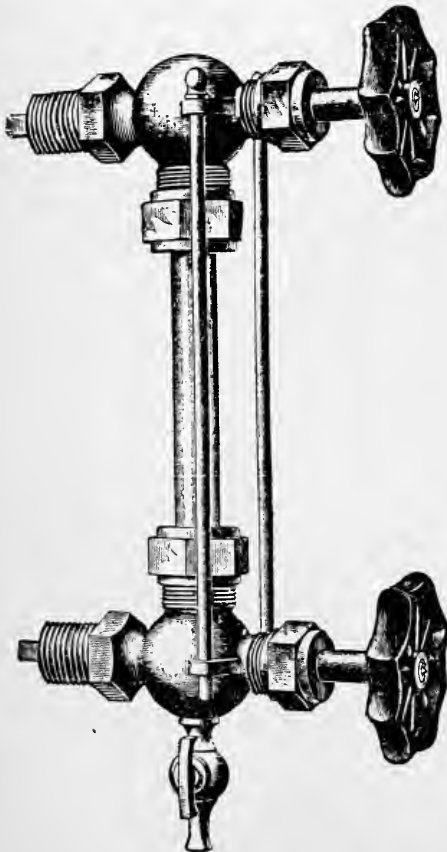
Boiler Connection,  $\frac{3}{8}$  inch.  
Glass,  $\frac{5}{8}$ x8 or 10 inches.

Each..... 3.75

No. 3.

Round Body, Polished, with two Guards,  
Wood Wheel. Boiler Connection,  $\frac{1}{2}$  inch.  
Glass,  $\frac{5}{8}$ x12 inches.

Each..... 4.25



No. 00.

No. 00.

Round Body, Polished, with two Guards,  
Iron Wheel.

Boiler Connection,  $\frac{3}{8}$  inch.  
Glass,  $\frac{5}{8}$ x8 or 10 inches.

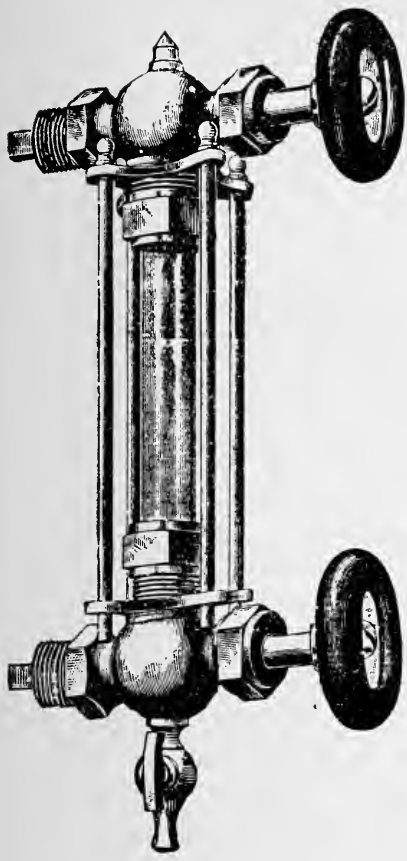
Each..... 3.25

No. 1.

Round Body, Bronzed, with two Guards.  
Iron Wheel. Boiler Connection,  $\frac{1}{2}$  inch.  
Glass,  $\frac{5}{8}$ x12 inches.

Each..... 3.00





No. 7.

SELF-CLEANING WATER GAUGES.

No. 7.

Round Body, Polished, with four Guards,  
Wood Wheel.

Boiler Connection,  $\frac{3}{4}$  inch.  
Glass,  $\frac{3}{4}$  x 16 inches.

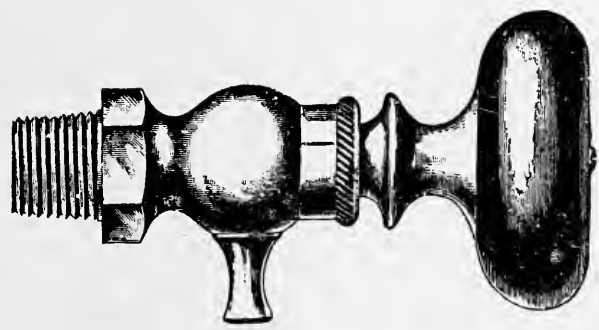
Each ..... 6.00

No. 5.

$\frac{1}{2}$  in. Round Body, Polished, with four Guards,  
Wood Wheel.

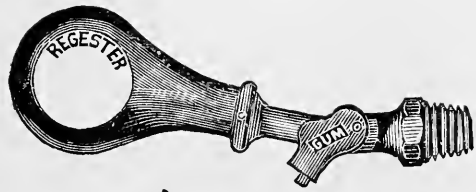
Boiler Connection,  $\frac{1}{2}$  inch.  
Glass,  $\frac{5}{8}$  x 16 inches.

Each ..... 5.25



Compression Gauge Cock without Stuffing Box.

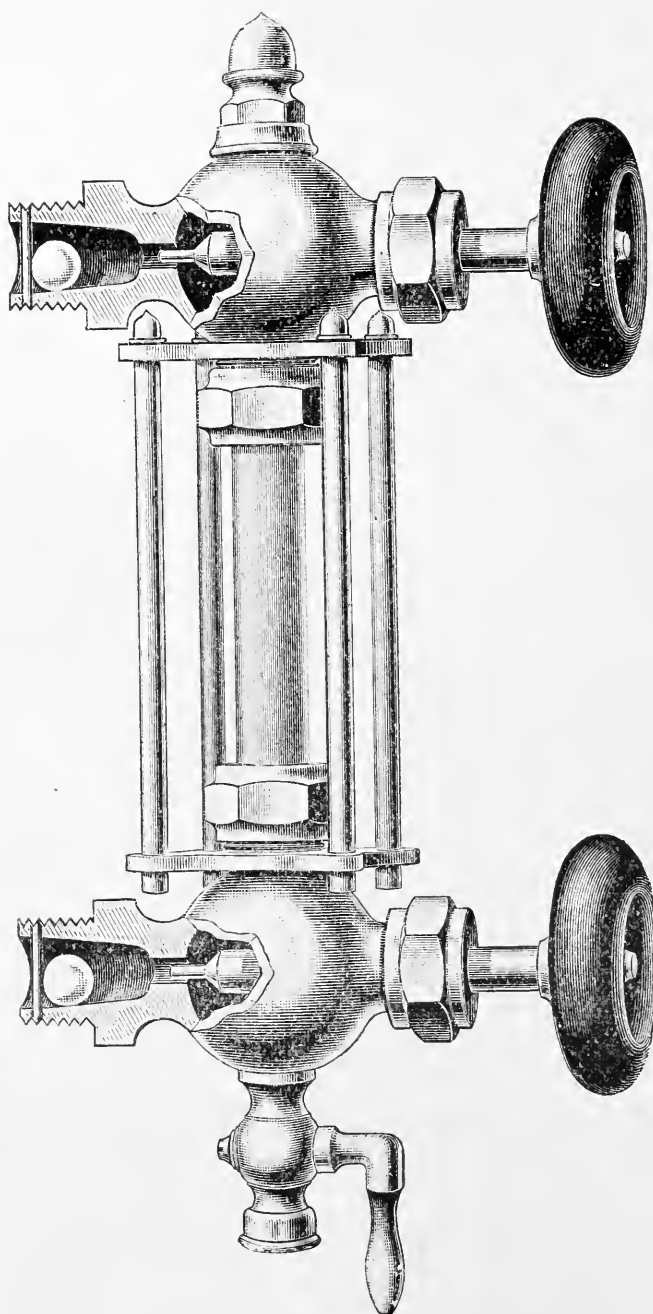
$\frac{3}{8}$	Iron Pipe Thread, each	.....	.95
$\frac{1}{2}$	" " " "	.....	1.00
$\frac{3}{4}$	" " " "	.....	1.25



Register Gauge Cock.

Size	.....	$\frac{1}{2}$ in.	$\frac{3}{4}$ in.
Each	.....	1.00	1.10

## AUTOMATIC SELF-CLOSING WATER GAUGE.



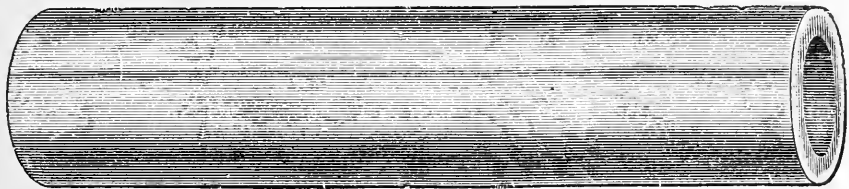
Automatic Self-Closing Water Gauge  
Special Heavy Pattern

Size .....  
Each .....

$\frac{1}{2}$  in.  
12.00

$\frac{3}{4}$  in.  
18.00

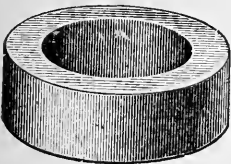
GAUGE GLASSES AND APPURTENANCES



Scotch Water Gauge Glasses.

Length, inches.	External Diameter.				
	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
10.....per doz.	3.00	3.00	3.60	5.04	6.12
11....."	3.24	3.24	3.96	5.64	6.72
12....."	3.60	3.60	4.32	6.12	7.32
13....."	3.84	3.84	4.80	6.60	7.92
14....."	4.20	4.20	5.16	7.08	8.52
15....."	4.44	4.44	5.52	7.56	9.12
16....."	4.80	4.80	5.88	8.16	9.72
17....."	5.04	5.04	6.24	8.64	10.32
18....."	5.40	5.40	6.60	9.12	10.92
19....."	5.64	5.64	7.08	9.60	11.52
20....."	6.00	6.00	7.44	10.20	12.12
22....."	6.60	6.60	8.16	11.16	13.44
24....."	7.20	7.20	8.88	12.12	14.64
30....."	9.00	9.00	11.16	15.24	18.24
36....."	10.80	10.80	13.44	18.24	21.96
48....."	14.52	14.52	18.00	24.36	29.16
60....."	18.12	18.12	22.56	30.48	36.48
72....."	21.84	21.84	27.12	36.48	43.80

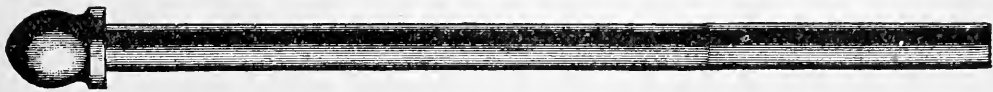
60 x 1 $\frac{1}{4}$  inches, \$60.00.



GAUGE GLASS WASHERS.

Size .....	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Per dozen.....	.40	.50	.60

BRASS GUARDS FOR WATER GAUGES.



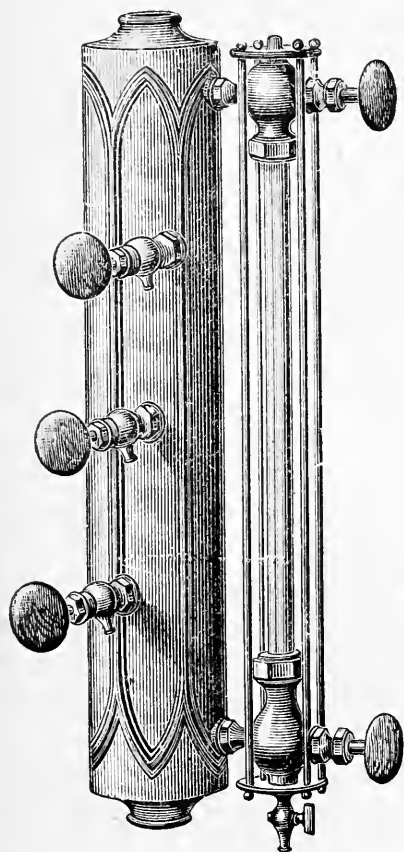
Length, inches.....	12	14	16	18	20
Finished, each.....	.09	.10	.12	.15	.20
Diameter of Rods, $\frac{3}{16}$ inch. Longer Lengths to order.					

GAUGE GLASS CUTTER.



Nickel Plated, each..... 1.50

## NASON WATER COLUMNS.



## IMPROVED PATTERN.

Sizes.....	No. 1.	No. 2.
Without Trimmings.....	1.50	2.00
With 3 Gauge Cocks and Water Gauge.....	6.00	7.00
With 3 Gauge Cocks, Water Gauge } and 5 inch Iron Case Steam Gauge }	12.00	13.00

## DIMENSIONS.

	No. 1.	No. 2.
Height of Column, inches.....	17 $\frac{1}{2}$	21 $\frac{3}{4}$
Diameter, inches.....	2 $\frac{1}{4}$	(Oval) 4x2 $\frac{1}{2}$
Boiler Connections.....	$\frac{1}{2}$	$\frac{3}{4}$
Gauge Cocks (3).....	$\frac{3}{8}$	$\frac{1}{2}$
Center Water Gauge Cocks,.....	12	16

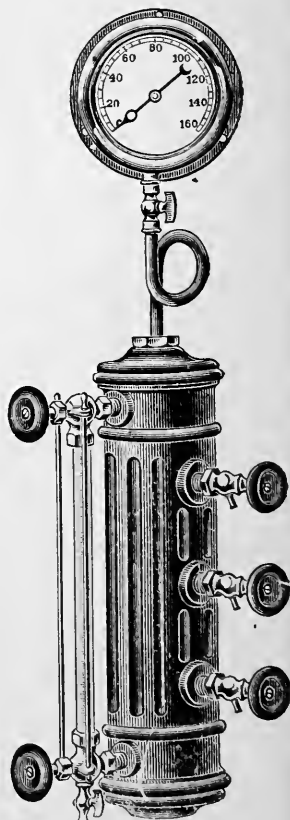
## PHILADELPHIA PATTERN.

Without Trimmings.....	3.00
With 3 Gauge Cocks and Water Gauge.....	10.00
With 3 Gauge Cocks, Water Gauge and 5 inch Iron Case Steam Gauge.....	16.00

## DIMENSIONS.

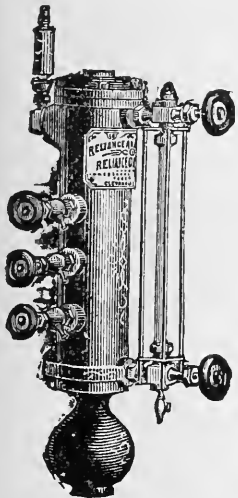
Height of Column.....	18 $\frac{1}{2}$ inches.
Diameter of Column.....	4 $\frac{1}{2}$ "
Boiler Connections.....	1 $\frac{1}{4}$ "
Gauge and Try Cocks.....	$\frac{1}{2}$ or $\frac{3}{4}$ "
Center of Water Gauge Cocks.....	14 "

Internal Area, 11 Square Inches.



## WATER COLUMNS.

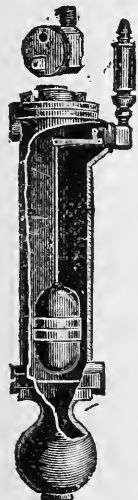
THE "RELIANCE" HIGH AND LOW WATER ALARMS—IRON JAPANNED.



Column Full Trimmed.



Showing High and Low with two floats.



Showing low alarm one float only.

- No. 1. Not guaranteed to work above 80 lbs. pressure.  
Variation between alarms 6". Size of water gauge and gauge cocks  $\frac{1}{2}$ ". Size of steam and of water connections 1".  
Untrimmed \$28.00.  
WITH WATER GAUGE AND GAUGE COCKS \$35.00.
- No. 11 $\frac{1}{2}$ . For any ordinary pressure.  
Variation between alarms 6". Size of water gauge and gauge cocks  $\frac{1}{2}$ ". Steam and water connections 1 $\frac{1}{4}$ ". Untrimmed \$28.00.  
WITH WATER GAUGE AND GAUGE COCKS \$35.00.
- No. 5. For any ordinary pressure.  
Variation between alarms 8". Size of water gauge and gauge cocks  $\frac{3}{4}$ ". Steam and water connections 1 $\frac{1}{4}$ ". Untrimmed \$30.00.  
WITH WATER GAUGE AND GAUGE COCKS \$40.00.
- No. 7. For Water Tube Boilers.  
Variation between alarms 12". Size of water gauge and gauge cocks  $\frac{3}{4}$ ". Size of steam and water connections 1 $\frac{1}{2}$ ". Untrimmed \$40.00.  
WITH WATER GAUGE AND GAUGE COCKS \$50.00.
- No. 9. For Vertical Boilers.  
Variation between alarms 18". Size of water gauge and gauge cocks  $\frac{3}{4}$ ". Size of steam and water connections 1 $\frac{1}{2}$ ". Untrimmed \$40.00.  
WITH WATER GAUGE AND GAUGE COCKS \$50.00.
- No. 11. Variation between alarms 24". Size of water gauge and gauge cocks  $\frac{3}{4}$ ". Size of steam and water connections 1 $\frac{1}{2}$ ". Untrimmed \$42.50.  
WITH WATER GAUGE (DOUBLE) AND 3 GAUGE COCKS \$57.50.
- No. 13. Variation between alarms 30". Size of water gauge and gauge cocks  $\frac{3}{4}$ ". Size of steam and water connections 1 $\frac{1}{2}$ ". Untrimmed \$45.00.  
WITH WATER GAUGE (DOUBLE) AND 4 GAUGE COCKS \$65.00.
- No. 15. Variation between alarms 36". Size of water gauge and gauge cocks  $\frac{3}{4}$ ". Size of steam and water connections 1 $\frac{1}{2}$ ". Untrimmed \$50.00.  
WITH 48" (DOUBLE) WATER GAUGE AND 4 GAUGE COCKS \$70.00.

These columns are made regularly up to 60" variation between alarms, and can be made of any variation for any purpose where steam or compressed air is used.

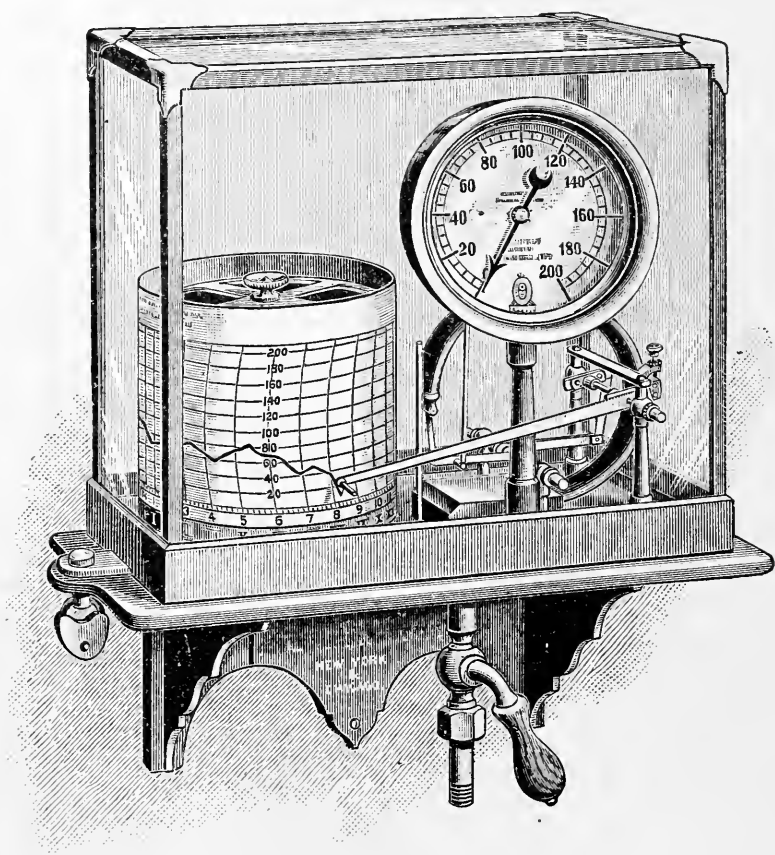
## LOW WATER ALARMS.

- No. 2. Not guaranteed to work perfectly above 100 lbs. pressure.  
Gauge cocks 3" apart. Water gauge centers 14". Water gauge and gauge cocks  $\frac{1}{2}$ ". Steam and water connections 1". Untrimmed \$25.00.  
WITH WATER GAUGE AND GAUGE COCKS \$32.00.
- No. 6. For any ordinary pressure.  
Water gauge and gauge cocks  $\frac{3}{4}$ ". Water gauge centers 16". Gauge cocks 4" apart. Steam and water connections 1 $\frac{1}{4}$ ". Untrimmed \$28.00.  
WITH WATER GAUGE AND GAUGE COCKS \$37.00.

VARIATION.—Do not make a mistake by selecting a column of too little variation.

They are as sure to whistle when the water reaches the alarm line as they are to remain quiet while it is kept between these points, and too narrow a limit may prove annoying. The No 5 is the most popular size with users of horizontal boilers, but all depends upon the fluctuations of the water. Do not select too small a column. The attendant will try to carry the water steadily midway between the alarms anyway, no matter how far they are apart.

THE "METROPOLITAN"  
PRESSURE RECORDING GAUGE.



The Metropolitan Recording Gauges are made for steam, water, gas, air, ammonia, and hydraulic pressures, also, for Vacuum. For use with ammonia and hydraulic pressures they are provided with steel tube springs.

- The "Metropolitan" Recording Gauge, under a glass cover, with wall-bracket, for steam, gas, or water pressure, not exceeding 300 lbs. per square inch,..... \$100.00
- The "Metropolitan" Recording Gauge, mounted as above, for ammonia pressure,..... 150.00
- The same, for hydraulic pressure up to 20,000 lbs. per square inch,..... 150.00

(The above prices include 100 charts, a file for same, and a bottle of ink.)

- Additional Charts, per hundred,..... 1.50
- File for same, ..... 3.00
- Recording Ink, per bottle,..... .25

Gauges and Charts for the following pressures are kept in stock :

- For steam, gas and air.....25, 50, 75, 150, 200 lbs. per square inch.
- For water.....100, 200, 300 feet of water column.

# “COLUMBIA” PRESSURE RECORDING GAUGE.

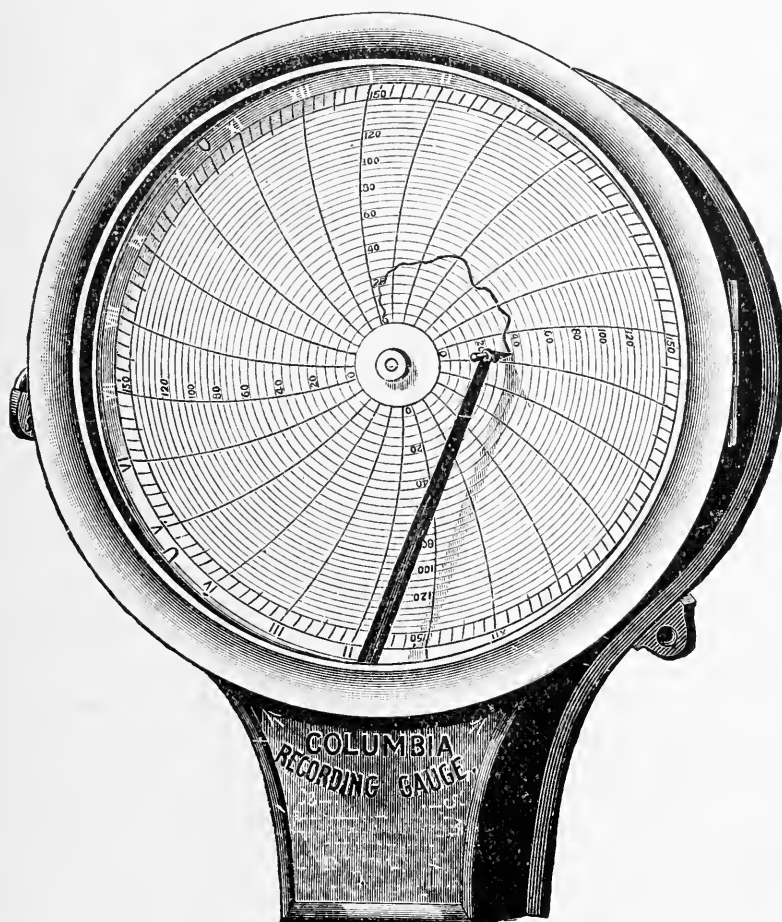


Fig. 92.

It consists of a Bourdon Tube Spring of suitable form in connection with a novel adjustable lever mechanism and a pointer, which carries the marking pen. It is provided with a clock movement, to which is attached a metal disc with the chart, making one revolution every 24 hours.

The circular lines on the chart indicate the pressure, while the radial arcs correspond to the hours of the day.

These Gauges are adapted for recording the pressure of steam, water, gas or air, and may be placed near the boiler, or at any distance therefrom—for instance, in the office—always giving a true record of the fluctuations of pressure taking place in boiler, water and gas pipes, etc. They are made for all pressures.

Gauges and charts for the following pressures are kept in stock :

For steam, gas and air,.....	25, 50, 75, 150, 200 lbs. per square inch.
For water,.....	100, 200, 300 feet of water column.

“Columbia” Recording Gauge, in highly japanned iron case, with hinged brass cover and lock, including 100 charts,.....	\$50.00
The same, with Electric Alarm Attachment,.....	60.00
Additional Charts, per hundred,.....	.75
Recording Ink, per bottle,.....	.25



PACKINGS.

ASBESTOS PISTON ROD PACKING $\frac{1}{4}$ in. to $2\frac{1}{2}$ in.....	Per lb.	.45
“ WICK “ .....	“	.45
COTTON PACKING.....	“	.30
“ WICKING.....	“	.30
CRANDALLS PACKING.....	“	1.20
EUREKA GUM CORE PACKING.....	“	.60
EMPIRE RUBBER “ “ .....	“	.50
GARLOCK SPIRAL RING “ .....	“	1.20
“ ELASTIC “ “ .....	“	1.20
“ SECTIONAL RING PACKING .....	“	1.20
HILLMANS HIGH PRESSURE “ .....	“	1.00
ITALIAN HEMP A. “ .....	“	.25
“ “ B. “ .....	“	.20
“ “ X. “ .....	“	.15
JUTE PACKING.....	“	.15
JENKINS SIEM PACKING.....	“	1.25
MANHATTAN PLUMBAGO PACKING SQUARE AND ROUND $\frac{1}{16}$ in., $\frac{1}{8}$ in., $\frac{3}{16}$ in.....	“	2.00
“ “ “ “ “ “ $\frac{1}{4}$ in. and larger.....	“	1.00
METALLIC PACKING.....	“	2.40
PEERLESS PISTON AND VALVE ROD.....	“	.80
“ SPIRAL.....	“	.80
PURE GUM.....	“	1.50
PATENT SQUARE.....	“	1.00
PHOENIX VALVE $\frac{1}{16}$ in. on Spools.....	“	2.50
“ “ $\frac{1}{8}$ in. “ .....	“	2.00
“ “ $\frac{3}{16}$ in. “ .....	“	1.25
“ “ HEMP CORE $\frac{1}{4}$ in. to $1\frac{3}{8}$ in.....	“	.60
“ “ GUM CORE $\frac{1}{4}$ in. to $1\frac{3}{8}$ in... ..	“	.80
SELDENS.....	“	.50
“ WITH RUBBER CORE.....	“	.60
SOAPSTONE.....	“	.20
TUCKS, SQUARE OR ROUND.....	“	.85
TUPPERS “ FLAX.....	“	.85
VULCABESTON WICK PACKING $\frac{1}{16}$ in. on $\frac{1}{2}$ , 1, 5 and 10 lb. spools.....	“	1.25
“ ROPE PACKING $\frac{1}{8}$ in.—on $\frac{1}{2}$ lb. spools—1 lb. $\frac{1}{8}$ in. Packing contains 128 ft. “		
“ “ “ $\frac{3}{16}$ in. } on 1 lb. “ { 1 lb. $\frac{3}{16}$ in. “ 50 “ “		
“ “ “ $\frac{1}{4}$ in. } “ { 1 lb. $\frac{1}{4}$ in. “ 25 “ “		
“ “ “ $\frac{3}{8}$ in. } on 1 lb. “ { 1 lb. $\frac{3}{8}$ in. “ 16 “ “		
“ “ “ $\frac{1}{2}$ in. } and 5 lb. “ { 1 lb. $\frac{1}{2}$ in. “ 9 “ “		
“ “ “ $\frac{5}{8}$ in. } “ { 1 lb. $\frac{5}{8}$ in. “ 8 “ “		
“ “ “ $\frac{3}{4}$ in. } on 5 lb. “ { 1 lb. $\frac{3}{4}$ in. “ $6\frac{1}{2}$ “ “		
“ “ “ $\frac{7}{8}$ in. } and 10 lb. “ { 1 lb. $\frac{7}{8}$ in. “ 4 “ “		
“ “ “ 1 in. } “ { 1 lb. 1 in. “ 3 “ “		
“ “ “ $1\frac{1}{4}$ in. } on 10 lb. “ { 1 lb. $1\frac{1}{4}$ in. “ $2\frac{1}{4}$ “ “		
“ “ “ $1\frac{1}{2}$ in. } and 25 lb. “ { 1 lb. $1\frac{1}{2}$ in. “ $1\frac{2}{3}$ “ “		
“ “ “ 2 in. } “ { 1 lb. 2 in. “ 1 “ “		

1.00

## SHEET PACKING.

	Thickness.	Per Pound,	1-Ply.	2-Ply.	3-Ply.	4-Ply.
	$\frac{1}{64}$ inch.....	\$0.70	\$...	\$....	\$....	\$....
	$\frac{1}{32}$ ".....	..	.65	...	....	....
	$\frac{1}{16}$ ".....	..	.60	.63	.66	....
Cloth Insertion.	$\frac{3}{32}$ ".....	..	.55	.58	.61	....
Cloth on one or both Sides.	$\frac{1}{8}$ ".....	..	...	.55	.58	.61
	$\frac{3}{16}$ ".....	..	...	...	.55	.58
	$\frac{1}{4}$ ".....	..	...	...	....	.55
Abestos Mill Board,.....					per pound,	.25
Jenkins Standard Sheet Packing,.....					"	.80
Peerless.....	"	"			"	.80
Plumbago.....	"	"			"	.75
Rainbow.....	"	"			"	.80
Ruby.....	"	"			"	.75
Usudurian.....	"	"			"	.80
Vulcabeston Sheet Packing, in sheets 36x36 in., hard and medium, 1-16 in. thick and upward,.....					"	1.00
Vulcabeston Sheet Packing, in sheets 36x36 in., hard and medium, 1-32 in. to 1-16 in. thick,.....					"	1.25
Vulcabeston Sheet Packing, in sheets 36x36 in., hard, for electrical purposes, 1-16 in. in thickness and upward,.....					"	1.25
Vulcabeston sheet Packing, in sheets 36x36 in., hard, for electrical purposes, 1-32 in. to 1-16 in. in thickness,.....					"	1.50


## GASKETS.

ASBESTOS GASKETS, of any size and shape, made promptly to order and shipped on shortest notice from any thickness of board required. Regular Sizes, per pound, \$0.60						
Cloth Insertion Gaskets, $\frac{1}{16}$ in. or less,.....	"	"			"	.90
" " " $\frac{3}{32}$ in. and larger,.....	"	"			"	.80
Corrugated Metal ".....			per square inch,			.02
Eclipse Sectional Rainbow Gaskets,.....			per pound,			1.00
Fibrous Gaskets, $\frac{1}{8}$ in. or less,.....	"	"			"	.90
" " $\frac{3}{32}$ in. and over,.....	"	"			"	.80
Jenkins Standard Gaskets.....	"	"			"	1.00
Moulded Gaskets,.....	"	"			"	.80
Pure Gum ".....	"	"			"	1.50
Rainbow " $\frac{1}{32}$ in. thick,.....	"	"			"	1.40
" " $\frac{1}{16}$ to $\frac{1}{8}$ in. thick,.....	"	"			"	1.30
" " $\frac{3}{32}$ to $\frac{1}{4}$ in. ".....	"	"			"	1.10
Vulcabeston Pressed Rope Gaskets, Less than 2 ounces in weight,.....			each		"	3.50
" " " 2 ounces and less than 6 ounces,.....			"		"	2.50
" " " 6 " " over,.....			"		"	2.00
Cotton Waste,.....					"	.12
Oakum,.....					"	.12

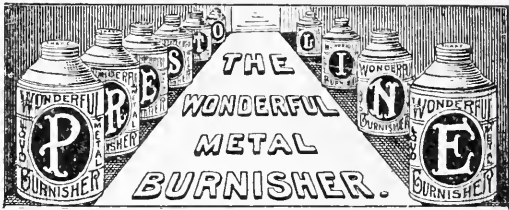
## ASBESTOS CEMENT FELTING.

A plastic covering for Boilers, Steam Pipes, Drums, &c. Is a light, elastic and indestructible non-conductor of heat..... per barrel, \$4.50

## MINERAL WOOL.

AVERAGE. 	Lbs. per Cubic Foot.	Lbs. per Bag.	Cubic Foot to Ton.	Bags to a Ton.	Price Per Pound.
Ordinary Slag Wool.....	14	58	135	35	1½
Selected Slag Wool.....	10	45	180	45	2½
Extra Slag Wool.....	8	36	222	55	4½
Ordinary Rock Wool.....	12	48	168	42	2½
Selected Rock Wool.....	8	32	250	62½	4½
Extra Rock Wool... ..	5	20	400	100	7½

MISCELLANEOUS.



PRESTOLINE (LIQUID.)

PRESTOLINE PASTE.

	Per doz.		Per doz.
HALF PINTS.....No. 1	\$3.00	HALF POUND BOXES.....	\$3.60
QUARTS....." 2	9.00	ONE POUND BOXES.....	6.00
HALF GALLONS....." 3	15.00	TWO AND A HALF POUNDS.....	12.00
GALLONS....." 4	28.80	FIVE POUND PAILS.....	22.20
		TEN POUND PAILS.....	42.00
PUTZ POMADE.....	Per lb.	.30	
ALBANY GREASE.....	"	.30	
NUBIAN PIPE CEMENT.....	"	.20	
GAS FITTERS CEMENT.....	"	.15	
ELECTRIC BELT DRESSING.....	"	.40	
IMPEROLENE, FOR PRESERVING WIRE ROPE.....	Per Gal.	1.25	
BELT LACING 1/4 in.....	Per 100 feet	1.00	
" " 3/8 ".....	"	1.50	
" " 1/2 ".....	"	2.00	
" " 5/8 ".....	"	3.25	
BELT AWLS, CAST STEEL.....	Per doz.	2.00	
BELT AWLS WITH EYE TO CARRY LACING THROUGH HOLE.....	"	2.00	
BELT AWLS, LOTHROP'S PATENT.....	"	9.00	
PLUMBERS' SOIL,.....	Pint cans, 35c. each. Qrt. each	.45	
1/2 AND 1/2 SOLDER.....	Per lb.	.16	
REFINED SOLDER.....	"	.16	
WIPING SOLDER.....	"	.16	
BRONZE, SILVER.....	"	3.00	
BRONZE, GOLD.....	"	3.00	
BRONZE ALUMINUM.....	"	4.00	
CYLINDER OIL.....	Per Gal.	1.00	
MACHINERY OIL.....	"	.80	
TAPPING OIL.....	"	.80	
CUTTING OIL.....	"	1.00	
ASBESTOS PAPER TO GO UNDER HAIR FELT.....	Per lb.	.12	
CANVAS TO GO OVER HAIR FELT.....	Sq. ft.	.05	

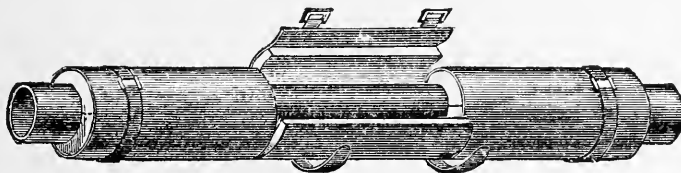


## STANDARD HAIR FELTING.

Put up in Bales containing 300  
square feet

Thickness, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Plain, per square foot.....	.06	.06 $\frac{1}{2}$	.07 $\frac{1}{2}$	.08	.09 $\frac{1}{2}$	.11	.14	.17

## ASBESTOS FIBROID SECTIONAL COVERING.



Inside Diam. Pipe.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12
Per Foot.....	.20	.20	.22	.25	.26	.29	.34	.39	.44	.47	.52	.56	.62	.69	.74	.84	.94	1.14
L's, each.....	.20	.25	.25	.25	.25	.29	.34	.39	.44	.50	.60	.68	.82	.95	1.10	1.20	1.35	1.50
T's, ".....	.30	.33	.33	.33	.33	.38	.44	.54	.58	.65	.73	.80	.90	1.20	1.25	1.50	1.75	2.25
Globe Valves, each.....	.25	.25	.25	.25	.25	.29	.44	.54	.58	.65	.73	.80	.90	1.20	1.25	1.50	1.75	2.25

Made in Canvas Finished Sections, 36 inches in length, with bands.

ASBESTOS FIBROID SECTIONAL BLOCKS— $\frac{1}{2}$  in. to  $3\frac{1}{2}$  in. thick, for Boilers, Drums, and large surfaces, special prices.

ASBESTOS FIBROID PLASTIC COVERING—(dry) per Bbl., \$5.00.

## MAGNESIA FIBROUS SECTIONAL COVERING.

Inside Diameter. Pipe.	Price per Lineal Foot.	Ells.	Tees.	Globe Valves.
$\frac{1}{2}$ in.	\$0.15	\$0.16	\$0.24	\$0.20
$\frac{3}{4}$ "	.16	.20	.26	.20
1 "	.18	.20	.26	.20
$1\frac{1}{4}$ "	.20	.20	.26	.20
$1\frac{1}{2}$ "	.22	.20	.26	.20
2 "	.24	.22	.29	.22
$2\frac{1}{2}$ "	.27	.25	.33	.33
3 "	.30	.29	.38	.38
$3\frac{1}{2}$ "	.34	.32	.42	.42
4 "	.38	.35	.47	.47
5 "	.46	.46	.60	.60
6 "	.50	.52	.72	.72
7 "	.55	.66	.96	.96
8 "	.60	.80	1.08	1.08
9 "	.65	.88	1.20	1.20
10 "	.75	1.00	1.40	1.40
12 "	.94	1.35	1.75	1.75

### SECTIONAL BLOCKS.

$\frac{1}{2}$  to  $3\frac{1}{2}$  in. thick.

For Boilers, Drums, and Large  
Surfaces.

Special Prices.

### MAGNESIA FIBROUS COM- POSITION.

DRY AND PLASTIC.

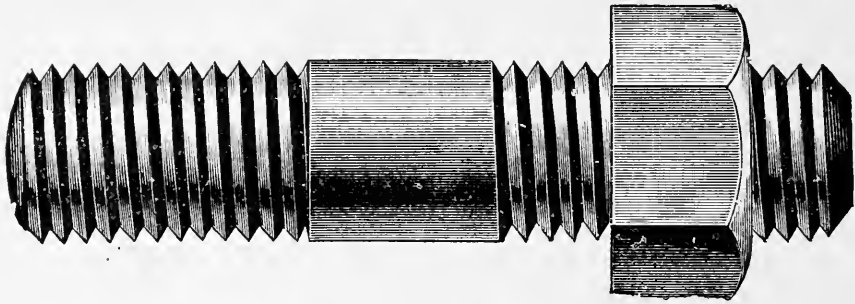
Per Barrel or Bag.....\$5.00

Made in 3-ft. Sections, Canvas Jacketed, with Bands.

This covering combines the fibrous strength of Asbestos with the lightness of Magnesia, and insulating qualities of both, in moulded form. Approved by steam users, and recommended as a cheap and serviceable non-conductor of heat.

STUD BOLTS.

ROUGH IRON, WITH CHAMFERED AND TRIMMED HEXAGON NUTS.

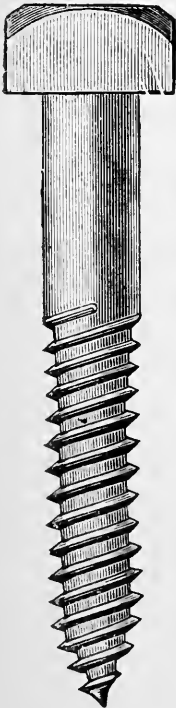


Price per 100.

Diameter.	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
No. Threads	16	14	13	12	11	10	9	8
LENGTH OVER ALL.	1 $\frac{1}{2}$	\$4.00	\$5.10	\$5.50	....	....	....	....
	1 $\frac{3}{4}$	4.10	5.25	5.65	....	....	....	....
	2	4.20	5.40	5.80	\$8.50	\$8.50	\$12.40	....
	2 $\frac{1}{4}$	4.30	5.55	5.95	8.75	8.75	12.70	....
	2 $\frac{1}{2}$	4.40	5.70	6.10	9.00	9.00	13.00	\$18.00
	2 $\frac{3}{4}$	4.50	5.85	6.25	9.25	9.25	13.30	18.50
	3	4.60	6.00	6.40	9.50	9.50	13.60	19.00
	3 $\frac{1}{4}$	4.70	6.15	6.55	9.75	9.75	13.90	19.50
	3 $\frac{1}{2}$	4.80	6.30	6.70	10.00	10.00	14.20	20.00
	3 $\frac{3}{4}$	4.90	6.45	6.85	10.25	10.25	14.50	20.50
	4	5.00	6.60	7.00	10.50	10.50	14.80	21.00
	4 $\frac{1}{2}$	5.25	6.90	7.30	11.00	11.00	15.40	22.00
	5	....	....	7.60	11.50	11.50	16.00	23.00
	5 $\frac{1}{2}$	....	....	8.00	12.00	12.00	16.60	24.00
	6	....	....	8.45	12.50	12.50	17.20	25.00
	7	....	....	....	13.60	13.60	18.60	27.00
	8	....	....	....	14.80	14.80	20.10	29.10
								40.10

Milled Studs, 15 per cent. extra.

In ordering give length of thread wanted on each end and length of body.



COACH AND LAG SCREWS  
WITH SQUARE HEADS.

Price per Hundred.

Adopted September 20, 1899, to take effect October 1, 1899.

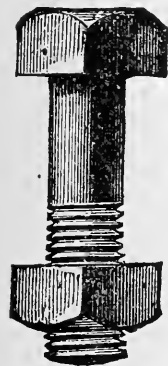
LENGTH IN INCH.	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$ & $\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
1 $\frac{1}{2}$	\$2.25	\$2.70	\$3.15	\$3.75	....	....	....	....
2	2.45	2.96	3.47	4.11	\$5.00	....	....	....
2 $\frac{1}{2}$	2.65	3.22	3.79	4.47	5.50	\$7.90	....	....
3	2.85	3.48	4.11	4.83	6.00	8.60	\$12.50	....
3 $\frac{1}{2}$	3.05	3.74	4.43	5.19	6.50	9.30	13.50	\$18.20
4	3.25	4.00	4.75	5.55	7.00	10.00	14.50	19.50
4 $\frac{1}{2}$	3.45	4.26	5.07	5.91	7.50	10.70	15.50	20.80
5	3.65	4.52	5.39	6.27	8.00	11.40	16.50	22.10
5 $\frac{1}{2}$	3.85	4.78	5.71	6.63	8.50	12.10	17.50	23.40
6	4.05	5.04	6.03	6.99	9.00	12.80	18.50	24.70
6 $\frac{1}{2}$	....	....	6.35	7.35	9.50	13.50	19.50	26.00
7	....	....	6.67	7.71	10.00	14.20	20.50	27.30
7 $\frac{1}{2}$	....	....	6.99	8.07	10.50	14.90	21.50	28.60
8	....	....	7.31	8.43	11.00	15.60	22.50	29.90
9	....	....	7.95	9.15	12.00	17.00	24.50	32.50
10	....	....	....	9.87	13.00	18.40	26.50	35.10
11	....	....	....	10.59	14.00	19.80	28.50	37.70
12	....	....	....	11.31	15.00	21.20	30.50	40.30

The following extras are to be understood as a part of the Coach and Lag Screw List :  
Hexagon Heads, 10% extra.  
Skein Screws are sold at the same price as Lag Screws.

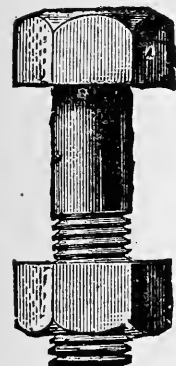
MACHINE BOLTS.

With Square Heads and Nuts, Finished Points, U. S. Standard Threads.

PRICE PER HUNDRED.



Machine Bolt,  
Square Head  
and Nut.



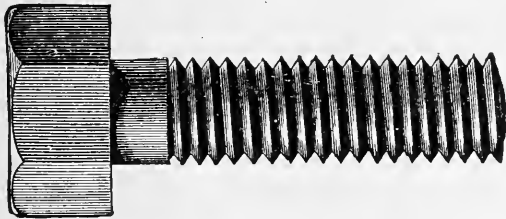
Machine Bolt,  
Hex. Head  
and Nut.

Length.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$ & $\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
$1\frac{1}{2}$	\$1.70	\$2.00	\$2.40	\$2.80	\$3.60	\$5.20	\$7.20	\$10.50	\$15.10
2	1.78	2.12	2.56	3.00	3.86	5.58	7.70	11.20	16.00
$2\frac{1}{2}$	1.86	2.24	2.72	3.20	4.12	5.96	8.20	11.90	16.90
3	1.94	2.36	2.88	3.40	4.38	6.34	8.70	12.60	17.80
$3\frac{1}{2}$	2.02	2.48	3.04	3.60	4.64	6.72	9.20	13.30	18.70
4	2.10	2.60	3.20	3.80	4.90	7.10	9.70	14.00	19.60
$4\frac{1}{2}$	2.18	2.72	3.36	4.00	5.16	7.48	10.20	14.70	20.50
5	2.26	2.84	3.52	4.20	5.42	7.86	10.70	15.40	21.40
$5\frac{1}{2}$	2.34	2.96	3.68	4.40	5.68	8.24	11.20	16.10	22.30
6	2.42	3.08	3.84	4.60	5.94	8.62	11.70	16.80	23.20
$6\frac{1}{2}$	2.50	3.20	4.00	4.80	6.20	9.00	12.20	17.50	24.10
7	2.58	3.32	4.16	5.00	6.46	9.38	12.70	18.20	25.00
$7\frac{1}{2}$	2.66	3.44	4.32	5.20	6.72	9.76	13.20	18.90	25.90
8	2.74	3.56	4.48	5.40	6.98	10.14	13.70	19.60	26.80
9	2.90	3.80	4.80	5.80	7.50	10.90	14.70	21.00	28.60
10	3.06	4.04	5.12	6.20	8.02	11.66	15.70	22.40	30.40
11	3.22	4.28	5.44	6.60	8.54	12.42	16.70	23.80	32.20
12	3.38	4.52	5.76	7.00	9.06	13.18	17.70	25.20	34.00
13	....	....	6.08	7.40	9.58	13.94	18.70	26.60	35.80
14	....	....	6.40	7.80	10.10	14.70	19.70	28.00	37.60
15	....	....	6.72	8.20	10.62	15.46	20.70	29.40	39.40
16	....	....	7.04	8.60	11.14	16.22	21.70	30.80	41.20
17	....	....	....	....	11.66	16.98	22.70	32.20	43.00
18	....	....	....	....	12.18	17.74	23.70	33.60	44.80
19	....	....	....	....	12.70	18.50	24.70	35.00	46.60
20	....	....	....	....	13.22	19.26	25.70	36.40	48.40

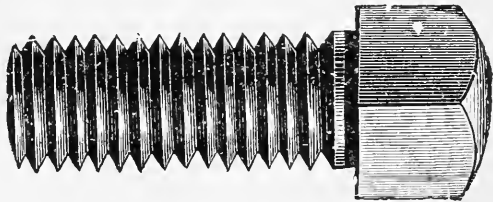
Bolts with Hexagon Heads or Hexagon Nuts, 10 per cent. extra.

If both Hexagon Heads and Hexagon Nuts, 20 per cent. extra.

FORGED TAP BOLTS.—THREADED TO THE HEAD.



HEXAGON.



SQUARE.

Price per 100.

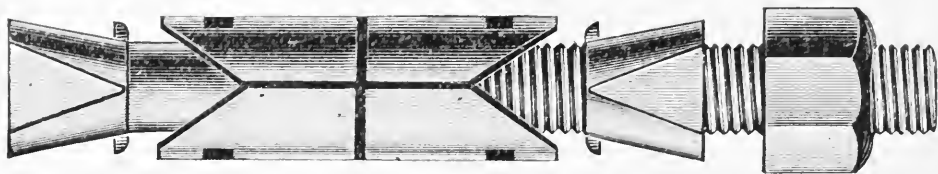
Diameter of Screw.	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$ & $\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1
Length.									
$1\frac{1}{2}$	\$1.00	\$1.15	\$1.35	\$1.60	\$2.00	\$3.00	\$4.20	\$6.00	\$8.00
$1\frac{3}{4}$	1.05	1.21	1.42	1.69	2.10	3.12	4.35	6.20	8.25
2	1.10	1.27	1.49	1.78	2.20	3.24	4.50	6.40	8.50
$2\frac{1}{4}$	1.15	1.33	1.56	1.87	2.30	3.36	4.65	6.60	8.75
$2\frac{1}{2}$	1.20	1.39	1.63	1.96	2.40	3.48	4.80	6.80	9.00
$2\frac{3}{4}$	1.25	1.45	1.70	2.05	2.50	3.60	4.95	7.00	9.25
3	1.30	1.51	1.77	2.14	2.60	3.72	5.10	7.20	9.50
$3\frac{1}{4}$	....	1.57	1.84	2.23	2.70	3.84	5.25	7.40	9.75
$3\frac{1}{2}$	....	....	1.91	2.32	2.80	3.96	5.40	7.60	10.00
$3\frac{3}{4}$	....	....	....	2.41	2.90	4.08	5.55	7.80	10.25
4	....	....	....	....	3.00	4.20	5.70	8.00	10.50

With Hexagon Heads, 10 per cent. extra.

Heads of Hexagon Tap Bolts are made finished size of United States Standard Nuts for same diameter.

We carry in stock only Tap Bolts milled under Head, but make them from rough iron to order.

WEDGE HEAD DOUBLE EXPANSION SCREW BOLT.



PRICE PER HUNDRED.

Length, over All.	DIAMETER.									
	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
2	\$12.75	\$14.20								
2 1/2	13.00	14.25	\$17.40	\$22.00						
3	13.05	14.30	17.50	22.10	\$25.50	\$32.00	\$33.00			
3 1/2	13.10	14.40	17.60	22.20	25.75	32.15	33.20			
4	13.20	14.50	17.70	22.30	26.00	32.30	33.40	\$48.00		
4 1/2		14.60	17.80	22.40	26.25	32.45	33.60	48.25		
5		14.70	17.90	22.50	26.50	32.60	33.80	48.50	\$52.00	\$73.90
5 1/2		14.75	17.95	22.60	26.60	32.75	34.00	48.75	52.43	74.45
6		14.80	18.00	22.70	26.70	32.90	34.20	49.00	52.86	75.00
6 1/2			18.10	22.80	26.80	33.05	34.40	49.25	53.29	75.55
7			18.20	22.90	26.90	33.20	34.60	49.50	53.72	76.10
7 1/2			18.25	23.00	27.10	33.35	34.80	49.75	54.15	76.65
8			18.30	23.10	27.20	33.50	35.00	50.00	54.58	77.20
9			18.40		27.30		35.20	50.50	55.01	77.75
10			18.50		27.40		35.40	51.00	55.44	78.30
Length of Expansion.	1 1/2	1 7/8	2 3/8	2 1/4	2 3/4	3	3	4	4 3/4	5
Size Hole to Receive Expansion.	7/16	9/16	3/4	11/16	7/8	7/8	1	1 3/16	1 3/8	1 5/8

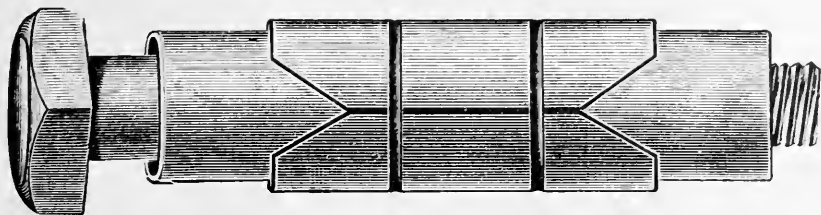
THE NEWEL POST OR COLLAR BOLT.



This bolt is sold under above list, subject to a different discount.



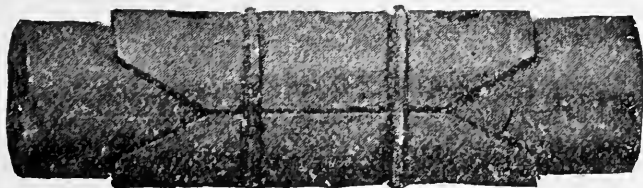
SQUARE HEAD DOUBLE EXPANSION BOLT.



PRICE PER HUNDRED.

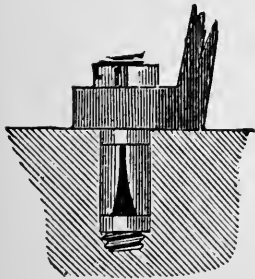
Length, Inches.	DIAMETER.									
	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
1 3/4	\$8.95	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	9.00	\$10.00	.....	\$16.35	.....	.....	.....	.....	.....	.....
2 1/2	9.05	10.05	\$12.40	16.50	.....	\$24.75	.....	.....	.....	.....
3	9.10	10.10	12.50	16.65	\$20.00	25.00	.....	.....	.....	.....
3 1/2	9.15	10.15	13.00	16.80	20.15	25.25	\$27.25	.....	.....	.....
4	9.20	10.20	13.70	16.95	20.30	25.50	27.50	\$40.00	.....	.....
4 1/2	9.25	10.25	13.80	17.10	20.45	25.75	27.75	40.30	.....	.....
5	9.30	10.30	13.90	17.25	20.60	26.00	28.00	40.60	\$52.00	\$73.90
5 1/2	9.35	10.35	14.00	17.40	20.75	26.25	28.25	40.90	52.43	74.45
6	9.40	10.40	14.10	17.55	20.90	26.50	28.50	41.20	52.86	75.00
6 1/2	.....	.....	14.20	17.70	21.05	26.75	28.75	41.50	53.29	75.55
7	.....	.....	14.30	17.85	21.20	27.00	29.00	41.80	53.72	76.10
7 1/2	.....	.....	14.40	18.00	21.35	27.25	29.25	42.10	54.15	76.65
8	.....	.....	14.50	18.15	21.50	27.50	29.50	42.40	54.58	77.20
9	.....	.....	.....	.....	21.65	27.75	29.75	42.70	55.01	77.75
10	.....	.....	.....	.....	21.80	28.00	30.00	43.00	55.44	78.30
Length of Expansion	1 1/2	1 7/8	2 3/8	2 1/4	2 3/4	3	3 1/4	4	4 3/4	5
Size Hole to Receive Expansion	1/2	9/16	1 1/16	1 1/8	7/8	7/8	1	1 1/4	1 1/2	1 5/8

Thickness of material to be fastened should always be stated when ordering bolts.



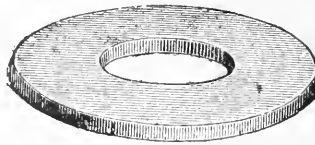
These bolts can be furnished with either Square, Hexagon or Countersunk Heads.

Bolts and Expansions made in Brass when required.



The action of these bolts is here illustrated. The wedge head of the bolt and the expansion over it is put into the hole ; then the work to be fastened is put on, and then a common nut serves to draw up the bolt, which will cause it to expand and firmly fix the whole together, also shown.

## WASHERS.

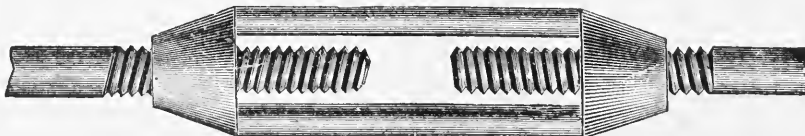


DIAMETER.	Size of Hole.	Thickness Wire Gauge.	Size of Bolt.	Price per lb.	No. in 100 Pounds.
$\frac{9}{16}$	$\frac{1}{4}$	No. 18	$\frac{3}{8}$	14.0	45000
$\frac{3}{4}$	$\frac{5}{16}$	" 16	$\frac{1}{4}$	12.2	13900
$\frac{7}{8}$	$\frac{3}{8}$	" 16	$\frac{5}{16}$	11.4	11250
1	$\frac{7}{16}$	" 14	$\frac{3}{8}$	10.5	6800
$1\frac{1}{4}$	$\frac{1}{2}$	" 14	$\frac{7}{16}$	9.7	4300
$1\frac{3}{8}$	$\frac{9}{16}$	" 12	$\frac{1}{2}$	9.2	2600
$1\frac{1}{2}$	$\frac{5}{8}$	" 12	$\frac{9}{16}$	9.1	2250
$1\frac{3}{4}$	$\frac{11}{16}$	" 10	$\frac{5}{8}$	9.0	1310
2	$\frac{13}{16}$	" 10	$\frac{3}{4}$	8.8	1010
$2\frac{1}{4}$	$\frac{15}{16}$	" 9	$\frac{7}{8}$	8.8	867
$2\frac{1}{2}$	$1\frac{1}{16}$	" 9	1	8.8	634
$2\frac{3}{4}$	$1\frac{1}{4}$	" 9	$1\frac{1}{8}$	8.8	500
3	$1\frac{3}{8}$	" 9	$1\frac{1}{4}$	9.0	367
$3\frac{1}{4}$	$1\frac{1}{2}$	" 8	$1\frac{3}{8}$	9.0	300
$3\frac{1}{2}$	$1\frac{5}{8}$	" 8	$1\frac{1}{2}$	9.2	267
$3\frac{3}{4}$	$1\frac{3}{4}$	" 8	$1\frac{5}{8}$	9.2	247
4	$1\frac{7}{8}$	" 8	$1\frac{3}{4}$	9.5	224
$4\frac{1}{4}$	2	" 8	$1\frac{7}{8}$	9.5	200
$4\frac{1}{2}$	$2\frac{1}{8}$	" 8	2	9.5	180

## EXTRA SIZES.

$\frac{1}{2}$	$\frac{1}{4}$	No. 18	$\frac{3}{16}$	17.5	45500
$\frac{5}{8}$	$\frac{5}{16}$	" 16	$\frac{1}{4}$	15.7	21500
$\frac{3}{4}$	$\frac{3}{8}$	" 16	$\frac{5}{16}$	14.4	16500
$\frac{7}{8}$	$\frac{7}{16}$	" 14	$\frac{3}{8}$	12.5	11500
$1\frac{1}{8}$	$\frac{1}{2}$	" 14	$\frac{7}{16}$	10.7	5450
$1\frac{1}{4}$	$\frac{9}{16}$	" 12	$\frac{1}{2}$	10.7	3650
$1\frac{1}{2}$	$\frac{11}{16}$	" 10	$\frac{5}{8}$	10.0	2150
$1\frac{3}{4}$	$\frac{13}{16}$	" 10	$\frac{3}{4}$	9.6	1400
2	$\frac{15}{16}$	" 9	$\frac{7}{8}$	9.6	1150
$2\frac{1}{4}$	$1\frac{1}{16}$	" 9	1	9.6	940

## TURNBUCKLES.



Diameter of Stub Ends, inches.	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Inside Opening of Buckle, inches	$4\frac{3}{4}$	$4\frac{3}{4}$	6	6	6	6	6	6	6	6	$6\frac{1}{4}$
Outside Length of Buckle, inches	$6\frac{1}{2}$	$6\frac{1}{2}$	8	$8\frac{1}{4}$	$8\frac{1}{2}$	9	9	$9\frac{1}{4}$	$9\frac{1}{2}$	$9\frac{3}{4}$	$10\frac{1}{2}$
Total Length of Buckle with Stud Ends in,.....inches }	17	17	21	23	23	23	23	23	23	23	25
Price, each.....	\$0.40	.42	.45	.50	.63	.75	.88	1.00	1.25	1.38	1.50

Longer Turnbuckles are made to order at special prices.

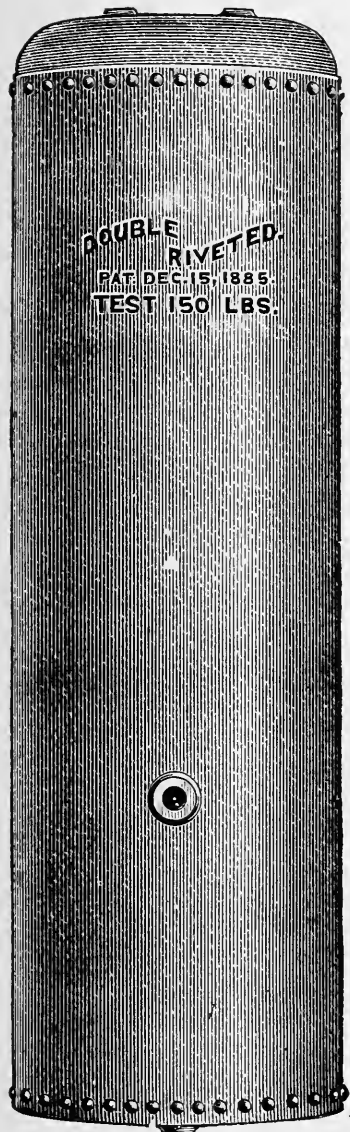
Turnbuckles with swivel in one end furnished to order.

# GALVANIZED IRON RANGE BOILERS.

STANDARD AND EXTRA HEAVY.

(150 lbs. Test.)

(250 lbs. Test.)



Capacity.	Sizes.	Price. Galvanized or plain.
18 galls.	3 ft. by 12 inches	\$14 50
21 "	3½ " 12 "	15 50
24 "	4 " 12 "	15 75
24 "	3 " 14 "	19 00
27 "	4½ " 12 "	18 50
28 "	3½ " 14 "	20 25
30 "	5 " 12 "	19 00
32 "	4 " 14 "	21 00
35 "	5 " 13 "	21 00
36 "	6 " 12 "	24 50
36 "	4½ " 14 "	21 50
40 "	5 " 14 "	24 00
42 "	4 " 16 "	26 00
47 "	4½ " 16 "	30 00
48 "	6 " 14 "	30 00
52 "	5 " 16 "	31 00

53 galls.	4 ft. by 18 inches.	\$31 50
63 "	6 " 16 "	38 00
66 "	5 " 18 "	38 00
79 "	6 " 18 "	44 00
82 "	5 " 20 "	45 50
98 "	6 " 20 "	61 50
100 "	5 " 22 "	63 50
120 "	6 " 22 "	74 00
120 "	5 " 24 "	72 50
141 "	6 " 24 "	103 00
168 "	7 " 24 "	120 00
192 "	8 " 24 "	132 00

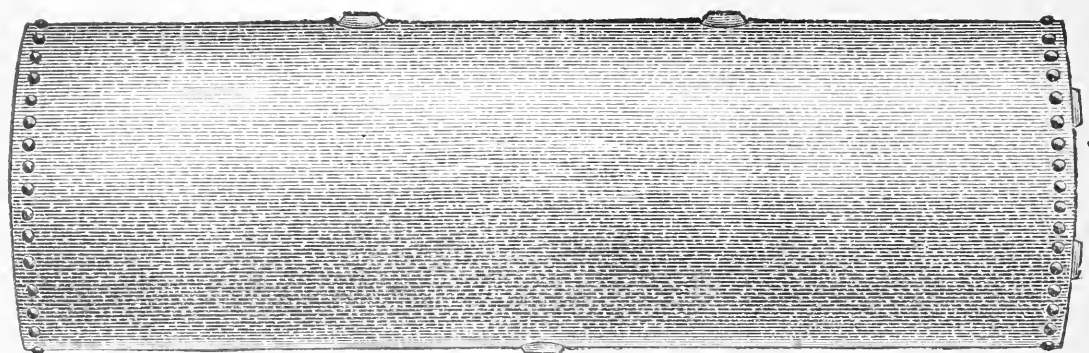
## LARGE EXTRA HEAVY GALVANIZED BOILERS.

250 lbs. Test.

Capacity in Gallons.	Length in Feet.	Diameter in Inches.	Price, Black.	Price, Galvanized.
250	6	30	\$100 00	\$115 00
325	8	20	125 00	144 00
400	10	30	150 00	174 00
475	8	36	165 00	190 00
600	10	36	200 00	230 00
700	12	36	235 00	270 00
1000	12	42	275 00	315 00
1250	12	48	325 00	370 00

HAND HOLES EXTRA.

## HORIZONTAL GALVANIZED IRON RANGE BOILERS.



## SIZES IN GENERAL USE.

Capacity About.	Sizes, Inches.	Price.
12 gal.	34 by 10	\$11.50
18 "	34 " 12	14.00
24 "	34 " 14	17.50
28 "	40 " 14	20.25
32 "	46 " 14	21.00

## OTHER SIZES.

Capacity.	Sizes.	Price. Galvanized or Plain.
18 gal.	3 ft. by 12 in.	\$14.50
21 "	3½ " 12 "	15.50
24 "	4 " 12 "	15.75
24 "	3 " 14 "	19.00
27 "	4½ " 12 "	18.50
28 "	3½ " 14 "	20.25
30 "	5 " 12 "	19.00
32 "	4 " 14 "	21.00
35 "	5 " 13 "	21.00
36 "	6 " 12 "	24.50
36 "	4½ " 14 "	21.50
40 "	5 " 14 "	24.00
42 "	4 " 16 "	26.00
47 "	4½ " 16 "	30.00
48 "	6 " 14 "	30.00
52 "	5 " 16 "	31.00

53 gal.	4 ft. by 18 in.	\$31.50
63 "	6 " 16 "	38.00
66 "	5 " 18 "	38.00
79 "	6 " 18 "	44.00
82 "	5 " 20 "	45.50
98 "	6 " 20 "	61.50
100 "	5 " 22 "	63.50
120 "	6 " 22 "	74.00
120 "	5 " 24 "	72.50
144 "	6 " 24 "	103.00
168 "	7 " 24 "	120.00
192 "	8 " 24 "	132.00

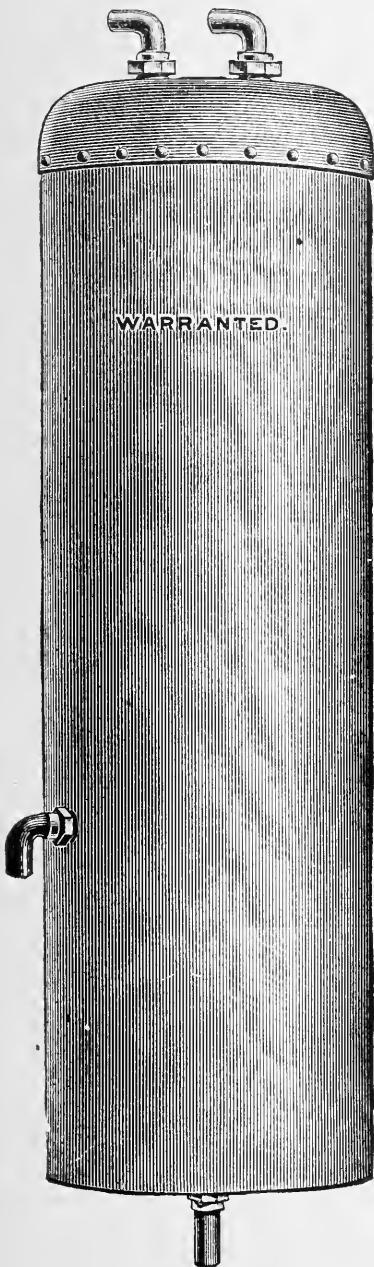
All the above sizes are made in Extra Heavy. Prices same as Upright Extra Heavy Boilers.

# STANDARD AND EXTRA HEAVY COPPER RANGE BOILERS.

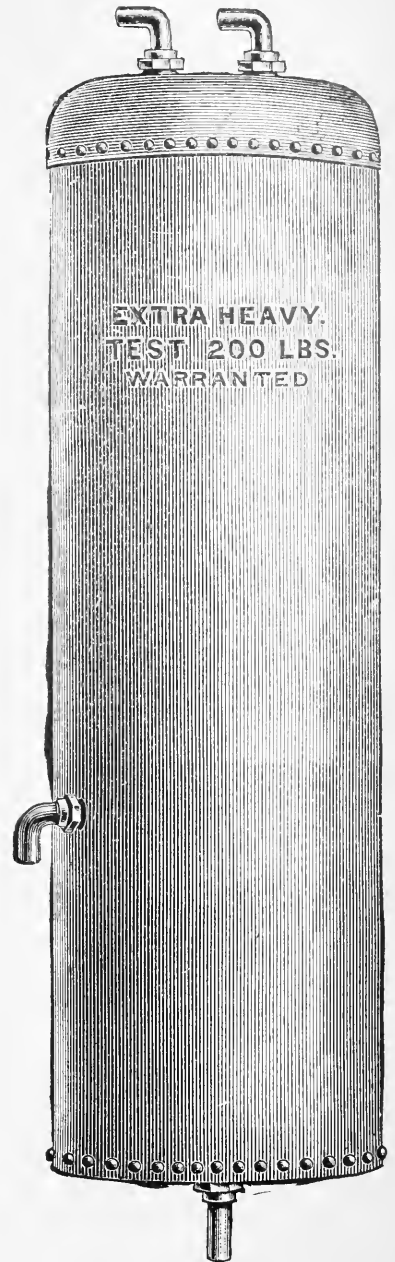
## EXTRA HEAVY COPPER RANGE BOILER.

200 LBS. TEST.

Capacity, Gallons.	Height, Inches.	Diameter, Inches.	Price, Regular Pressure.	Boxing.
30	60	12	30.00	1.00
35	60	13	35.00	1.00
40	60	14	40.00	1.25
50	66	15	50.00	1.50
60	72	16	60.00	1.50
80	72	18	100.00	2.00
100	72	20	120.00	3.00



STANDARD COPPER BOILER.

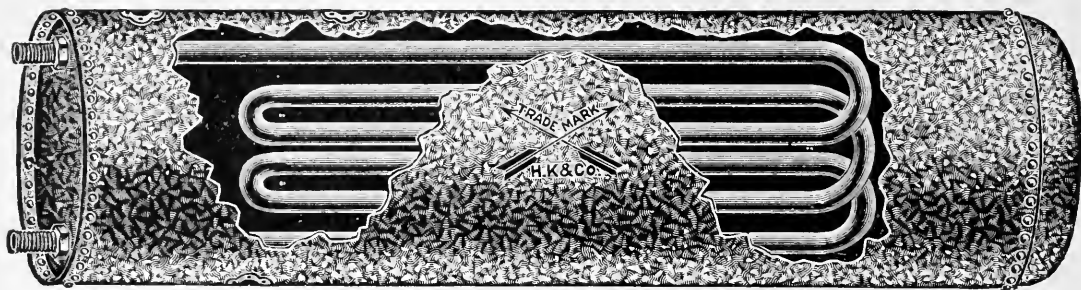


EXTRA HEAVY COPPER RANGE BOILER, 200 LBS. TEST.

## STANDARD COPPER RANGE BOILER.

Capacity, Gallons.	New York Pressure, "Light Pressure."	Brooklyn Pressure, "Medium Pressure."	Double Boilers.	Boxing.
30	24.00	26.00	----	1.25
35	27.00	30.00	----	1.50
40	32.00	34.00	----	1.50
45	37.00	39.00	----	1.75
50	41.00	43.00	----	1.75
60	52.00	55.00	80.00	2.00
70	59.00	63.00	----	2.75
80	68.00	72.00	100.00	3.50
90	80.00	84.00	----	4.00
100	88.00	92.00	112.00	4.50

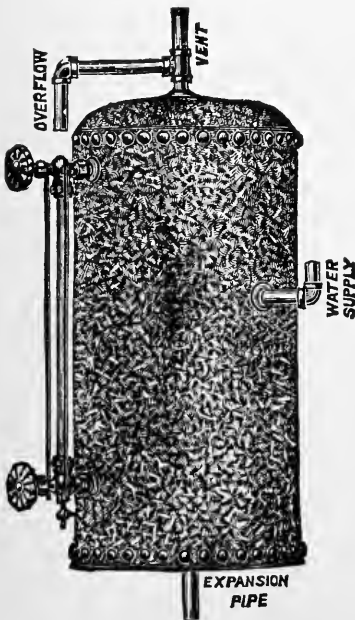
GALVANIZED EXTRA HEAVY IRON BOILERS.



With Tinned Copper Tube Coils Inside.   Furnished Horizontal or Vertical.

CAPACITY.		SIZE.		HORIZONTAL OR VERTICAL. Galv'd or Plain.
18 gals.	-----	3 feet by	12 inches	\$ 28.00
24 "	-----	4 "	12 "	30.00
30 "	-----	5 "	12 "	32.00
35 "	-----	5 "	13 "	34.00
40 "	-----	5 "	14 "	36.00
52 "	-----	5 "	16 "	44.00
66 "	-----	5 "	18 "	60.00
82 "	-----	5 "	20 "	68.00
100 "	-----	5 "	22 "	88.00
120 "	-----	5 "	24 "	96.00
144 "	-----	6 "	24 "	124.00
168 "	-----	7 "	24 "	144.00
192 "	-----	8 "	24 "	164.00
140 gals.	-----	4 feet by	30 inches	\$136.00
185 "	-----	5 "	30 "	164.00
203 "	-----	5½ "	30 "	172.00
225 "	-----	6 "	30 "	192.00
212 "	-----	4 "	36 "	180.00
265 "	-----	5 "	36 "	212.00
290 "	-----	5½ "	36 "	228.00
315 "	-----	6 "	36 "	244.00
360 "	-----	7 "	36 "	276.00
425 "	-----	8 "	36 "	312.00

HOT WATER EXPANSION TANKS.



This cut represents an Expansion Tank for Hot Water Heating which is made of the best material and heavily galvanized. All are thoroughly tested under pressure before being shipped, and are supplied with all necessary openings for pipe connections and water gauge.

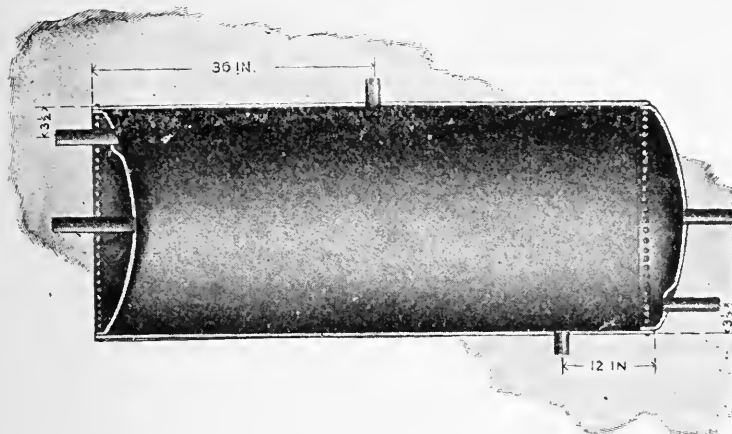
These tanks are tapped top and bottom 1 inch, and on the side ½ inch for water gauge, and are also tapped on the side for 1 inch water supply.

LIST PRICES ON EXPANSION TANKS.

Capacity, 10 gallons.	Size, 12 in. by 20 in.	Price,
" 12 "	12 " 24 "	8.00
" 15 "	12 " 30 "	8.50
" 18 "	12 " 36 "	9.00
" 20 "	14 " 30 "	9.50
" 24 "	14 " 36 "	12.50
" 26 "	16 " 36 "	13.00
" 32 "	16 " 36 "	14.00
" 42 "	16 " 48 "	15.00
" 66 "	18 " 60 "	16.50
" 82 "	20 " 60 "	31.00
" 100 "	22 " 60 "	37.00
" 120 "	24 " 60 "	51.00
		58.00

WATER GAUGE, net \$2.00.

## BLACK STEEL STORAGE TANKS.



Manholes in head, extra, \$15.00 each, List.  
 Manholes in shell, extra, \$18.00 each, List.  
 Handholes, extra, \$5.00 each, List.

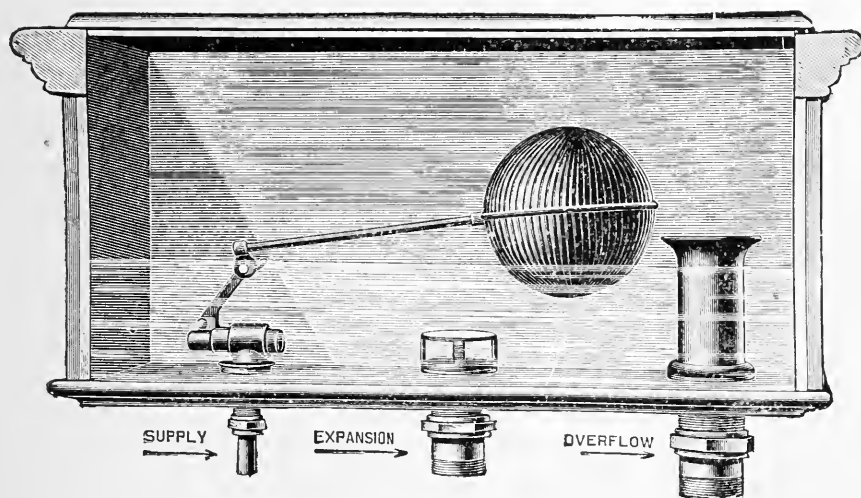
### COILS.

We can, upon special order, equip both the Black and the Galvanized Storage Tanks with return bend or spiral coils, in black iron, galvanized iron or copper pipe. Prices for coils quoted on application.

### VERTICAL AND HORIZONTAL.

Capacity Gallons.	Diameter Inches.	Length Feet.	Approximate Weight.	Price List.	Capacity Gallons.	Diameter Inches.	Length Feet.	Approximate Weight.	Price List.
66	18	5	200	\$36.00	300	30	8	600	\$70.00
85	20	5	230	38.00	325	36	6	750	80.00
100	22	5	260	42.00	365	36	7	820	90.00
120	24	5	300	45.00					
145	24	6	325	50.00	420	36	8	900	100.00
170	24	7	370	55.00	430	42	6	1100	100.00
					575	42	8	1350	115.00
180	30	5	450	55.00	720	42	10	1600	130.00
215	30	6	500	60.00	865	42	12	1800	145.00
250	30	7	550	65.00	1000	42	14	2050	160.00

## IDEAL AUTOMATIC EXPANSION TANKS.



The Expansion Tank above illustrated, aside from being ornamental, is absolutely automatic in its operation, *insuring always that the system will be full of water*, and in this respect will prove a great convenience to the house-owner. The Tank is made of hardwood, dovetailed corners, having a tight cover, and lined with sheet copper. It can be supplied in any finish of

wood, to harmonize with the finish of room in which it is installed. It does not require altitude gauge, nor guage glass and fittings. The price asked makes it easily available without increasing expense of the job. Inside measurements of Tank are: 20 inches long, 9 inches wide, 10 inches deep; and of ample capacity for use on any job of hot-water work to which there is attached 2000 feet of radiation or less. Larger sizes made on special order.

PRICE LIST FOR TANKS. (Including expansion and overflow couplings, with iron pipe threads.)

No. 282.	Plain, without varnish, plain oak or ash	Price, each \$7.00
No. 252.	Beaded, varnished, plain oak or ash	" " 7.50
No. 262	Rounded corners, varnished, plain oak or ash	" " 8.50
No. 0252.	Beaded, varnished, genuine cherry, walnut or quartered oak	" " 8.25
No. 0262.	Rounded corners, varnished, genuine cherry, walnut or quartered oak	" " 9.25

Order by number and specify finish desired.



TANK HEATERS FOR HOT WATER SUPPLY.



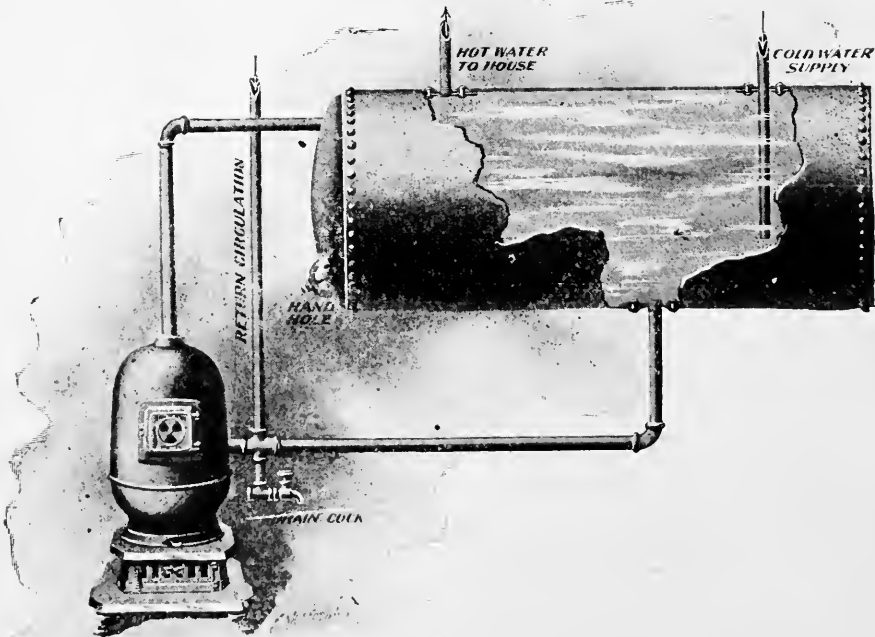
FULL VIEW.



OPFN VIEW.

SIZES AND PRICES.

Size No.....	10	12	16
Sq. Ft. Radiation Heater Will Supply.....	100	200	285
Gallons of Water Per Hour.....	150	260	370
Height, inches.....	37	40	42
Size Flow and Return Pipes.....	1 1/4	1 1/2	2
Price.....	\$35.50	50.00	67.20



Showing Heater connected with House Supply Tank.

## BOILER COUPLINGS AND STANDS.

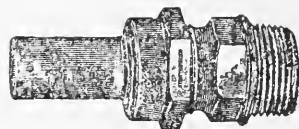


### BOILER COUPLINGS.—FOR IRON BOILER.

PLAIN FACE.				GROUND FACE.			
Size..in.	1/2,	3/4,	1,	Size..in.	1/2,	3/4,	1,
Dozen..	\$8.50	9.00	12.00	Dozen..	9.50	10.00	13.50

PLAIN FACE.			
Size..in.	$\frac{1}{2}$ ,	$\frac{3}{4}$ ,	1,
Dozen..	\$7.50	8.00	11.00

GROUND FACE.			
Size..in.	1/2,	3/4,	1,
Dozen..	8.50	9.00	12.50



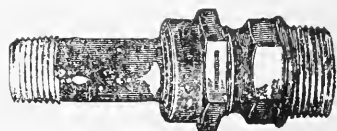
SCREWED FOR IRON PIPE CONNECTIONS.

PLAIN FACE.			GROUND FACE.		
Size.....in.	$\frac{3}{4}$ ,	I,	Size.....in.	$\frac{3}{4}$ ,	I,
Dozen.....	\$13.50	16.50	Dozen.....	14.50	18.00

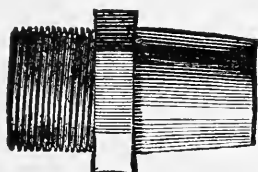
PLAIN FACE.

Size.....in.	$\frac{3}{4}$ ,	I,
Dozen.....	12.50	15.50

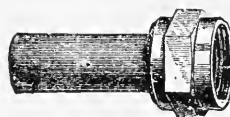
GROUND FACE.		
Size.....in.	$\frac{3}{4}$ ,	I,
Dozen.....	13.50	17.00



## SOLDERING NIPPLES AND UNIONS.



### Soldering Nipple.



Soldering Union.

Size.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Soldering Nipples, doz ....	\$1.50	1.75	2.25	2.50	3.00	5.00	7.50	10.00	14.00	20.00	28.00
Soldering Unions, each ....	.18	.20	.24	.30	.35	.50	.75	1.00	1.50	----	----



## IMPROVED BOILER STANDS.

HEIGHT, 21 INCHES.

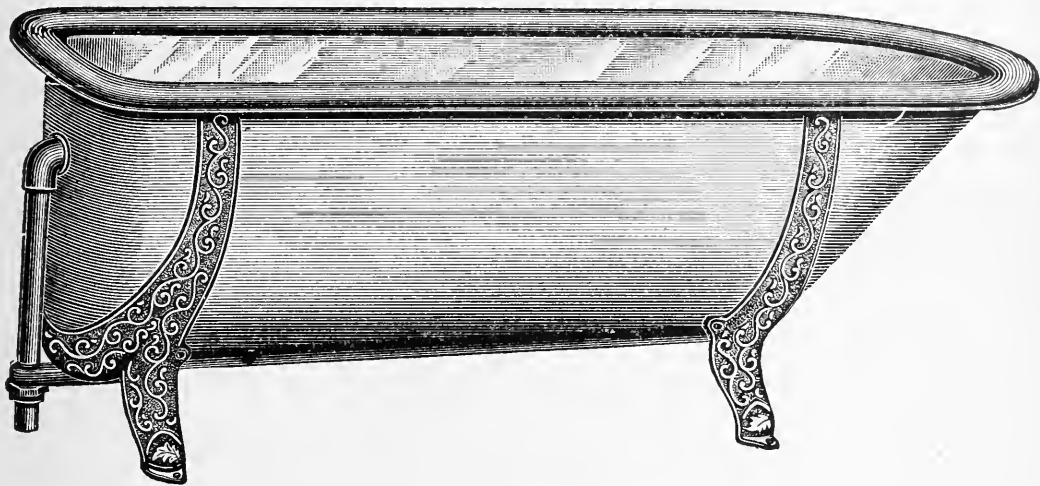
Size Ring.....	12	13	14	15	16	17	18	20	22	24
Plain.....	\$1.25	1.30	1.40	1.50	1.75	1.85	2.00	2.25	2.75	3.50
Galvanized....	2.50	2.60	2.70	3.00	3.25	3.60	3.80	4.50	5.00	6.50

Extension Piece to Raise Standard above 21 inches and not over 30 inches, plain, each.....	\$0.50
Galvanized, each.....	.75



STEEL BATHS.

NO. 2, STEEL CASED. CONNECTED WASTE AND OVERFLOW.



AMERICAN PATTERN.

Connected waste and overflow. Asbestos lining between copper and steel.

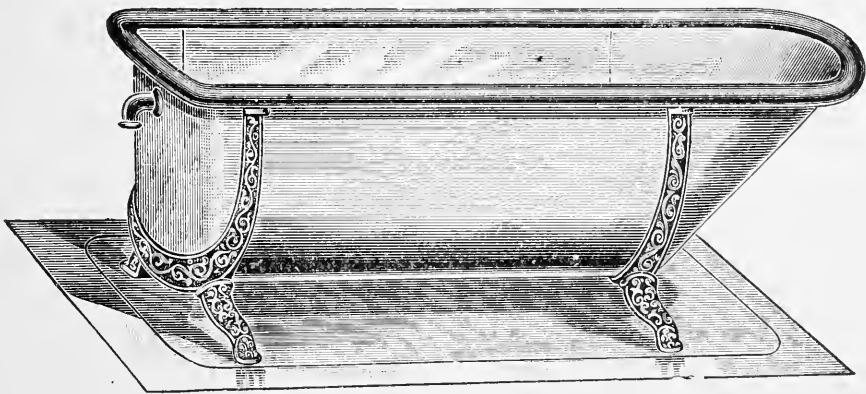
	12 oz.	14 oz.	16 oz.
Size 4 ft. 6 in.....	24.50	26.50	28.50
Size 5 ft.....	25.50	27.50	29.50
Size 5 ft. 6 in.....	26.50	28.50	30.50
Size 6 ft.....	28.50	30.50	32.50

Dimensions.

Length Outside Rim, 4 ft. 6 in. ; 5 ft. ; 5 ft. 6 in. ; and 6 ft.  
Width Outside Rim, 28 in.; Depth Inside 17½ in.; Height from floor 23½ in.

Ready to set up ; but one joint to make. Painted light gray with gold bronze legs. Nickel plated connected waste and overflow, fitted for 4½ Fuller Cock, 3⅜ centers, unless otherwise ordered. Hardwood rim, oak or cherry, with cabinet finish.

No. 3, GALVANIZED STEEL, COMMON OVERFLOW.



AMERICAN PATTERN.

Coated inside with white enamel baked on.

Size.....	4 ft. 6 in.	5 ft.	5 ft. 6 in.	6 ft.
Each.....	18.00	19.00	20.00	23.00

Add \$1.50 to lists for connected waste and overflow.

Length Outside Rim, 4 ft. 6 in. ; 5 ft. ; 5 ft. 6 in. ; and 6 ft.  
Width Outside Rim, 26 in. ; Depth Inside 17½ in. ; Height from floor 23½ in.

“STANDARD”  
PORCELAIN ENAMELED BATH.  
THE “PERFECTO.”

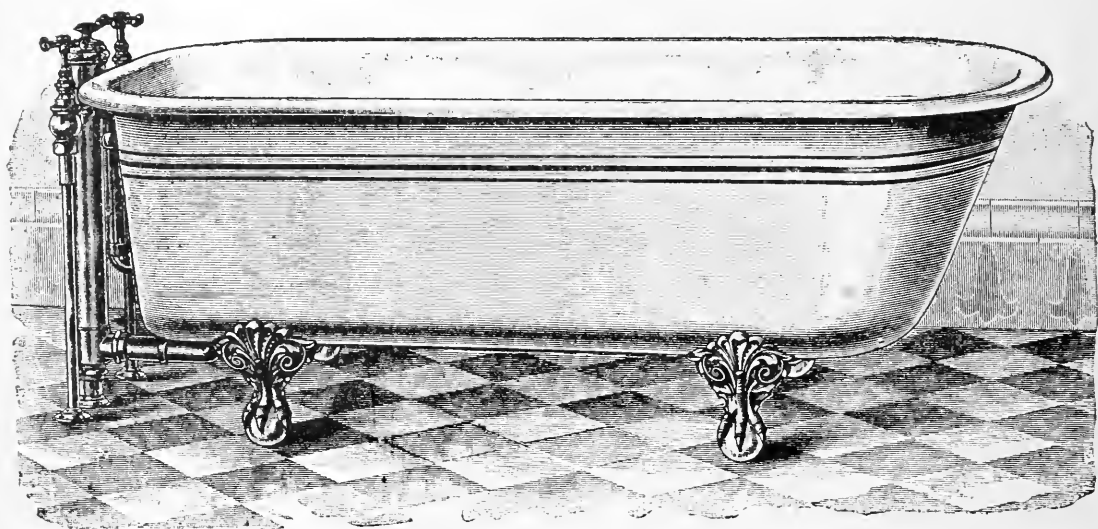


PLATE 48 B.  
DECORATED OUTSIDE.

White Enameled “Perfecto” Bath Tub, with  $2\frac{1}{4}$ -inch Enameled Roll Rim, Bottom Bell Supply Fitting, Compression Valves with Brass Supply Pipe and Imperial Bath Waste, Fittings Polished and Nickel-Plated all over. Exterior finished in Ivory White with Gold Bands.

DIMENSIONS:—Width, inside, 24 inches; Depth, 17 inches; Height from floor, 22 inches.

Size of Tub (over Rim)---	4 ft.	$4\frac{1}{2}$ ft.	5 ft.	$5\frac{1}{2}$ ft.	6 ft.
Price as described-----	\$61.15	\$63.65	\$67.00	\$71.15	\$76.15
Length, including Fitting-	4 ft. $4\frac{1}{2}$ ins.	4 ft. $10\frac{1}{2}$ ins.	5 ft. $4\frac{1}{2}$ ins.	5 ft. $10\frac{1}{2}$ in.	6 ft. $4\frac{1}{2}$ ins.

# “STANDARD” PORCELAIN ENAMELED BATH.

## THE “PERFECTO.”

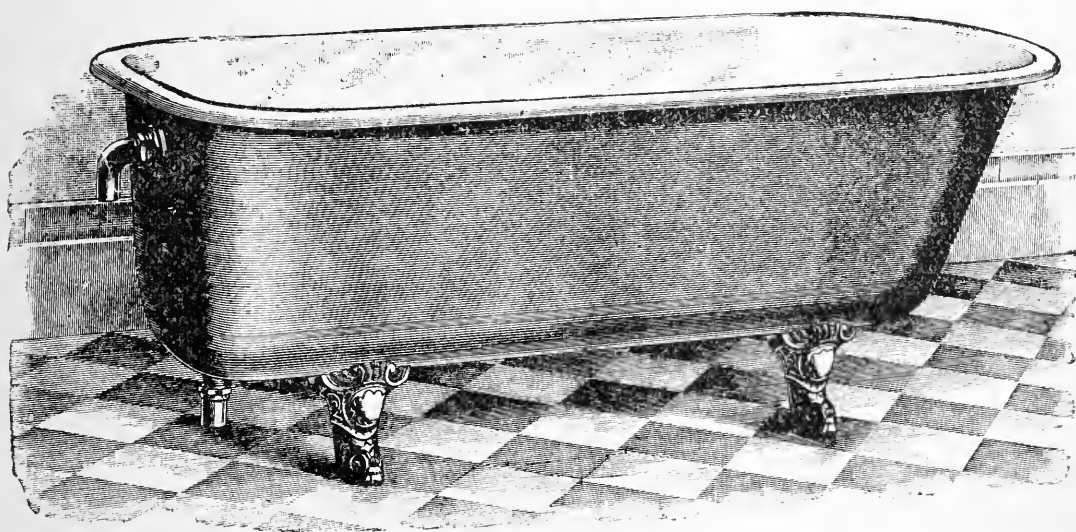


Plate 35B.

White Enameled “Perfecto” Bath Tub, with  $2\frac{1}{4}$ -inch Enameled Roll Rim, Brass Common Overflow Connection with Nickel-plated Strainer, Waste Plug with Rubber Stopper.

DIMENSIONS:—Width, inside, 24 inches; Depth, 17 inches; Height from floor, 22 inches.

Size of Tub (over Rim)---	4 ft.	$4\frac{1}{2}$ ft.	5 ft.	$5\frac{1}{2}$ ft.	6 ft.
Price as described-----	\$24.15	\$26.65	\$30.00	34.15	39.15
Length, including Fitting-	4 ft. $2\frac{1}{2}$ ins.	4 ft. $8\frac{1}{2}$ ins.	5 ft. $2\frac{1}{2}$ ins.	5 ft. $8\frac{1}{2}$ ins.	6 ft. $2\frac{1}{2}$ ins.

When so ordered, “Perfecto” Bath will be furnished with Legs to stand 24 inches from floor.

“STANDARD” PORCELAIN ENAMELED BATH.  
THE “ELYSIAN.”

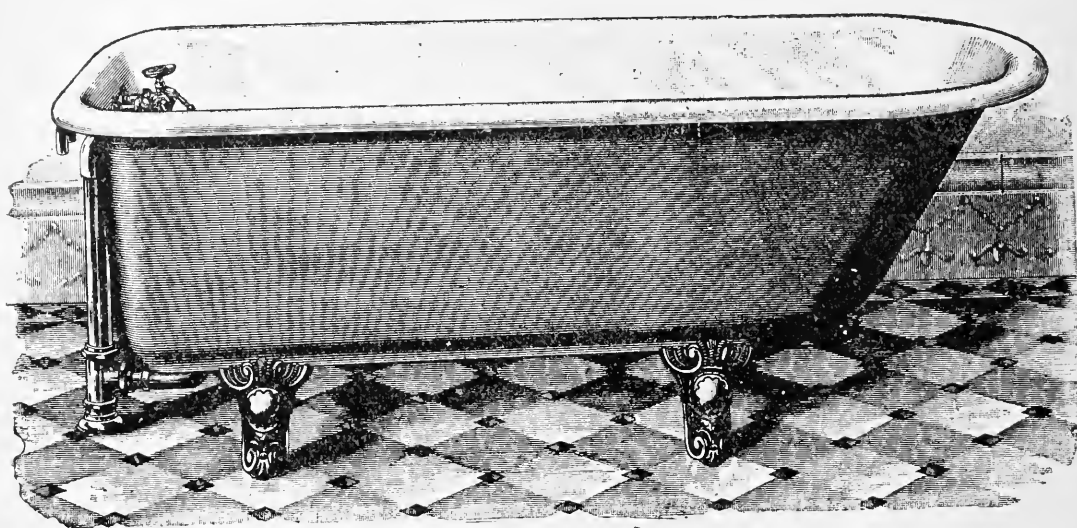


PLATE 23 B.

White Enameled “Elysian” Bath Tub, with 3-inch Enameled Roll Rim; No. 4½ Nickel-plated Fuller Double Bath Cock, with Polished and Nickel-plated Connected Waste and Overflow, with Nickel-plated Strainer and Rubber Stopper.

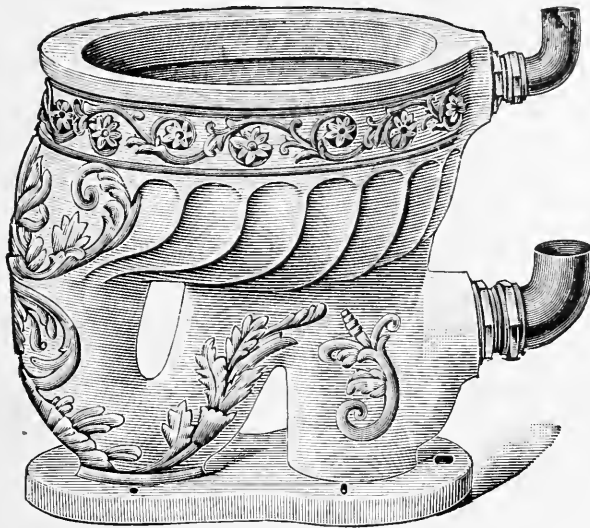
DIMENSIONS:—Width inside, 23 inches; Depth, 18½ inches; Height from floor, 24 inches.

Size of Tub (inside)-	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.
Price, as described-	\$33.85	\$36.75	\$40.50	\$45.10	\$53.40
Length over Rim---	4 ft. 4 ins.	4 ft. 10 ins.	5 ft. 4 ins.	5 ft. 10 ins.	6 ft. 5½ ins.
Length over Fitting-	4 ft. 5 ins.	4 ft. 11 ins.	5 ft. 5 ins.	5 ft. 11 ins.	6 ft. 6½ ins.

If with two Nickel-plated Brass Supply Pipes, add \$2.50.



## WASHOUT CLOSET.



No. 3. Front Outlet Embossed.

Over all.....20 inches.      Space required.....9 inches.

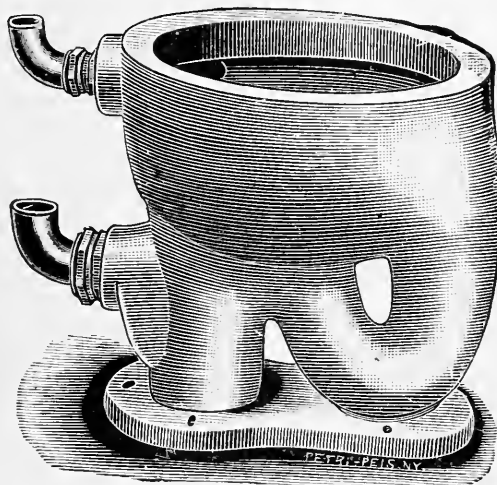
Diameter Top, outside.....14 x 15 inches.

Price, without Couplings.....\$9.00

Add for 1¼-inch coupling, \$0.75; 2-inch coupling, \$1.40.

The above made with or without vent.

## WASHOUT CLOSET.



No. 3. Front Outlet Plain.

Over all.....16 inches.      Space required.....8¾ inches

Diameter Top, outside.....14 x 15 inches.

Price, without Couplings.....\$8.00

Add for 1¼-inch coupling, \$0.75; 2-inch coupling, \$1.40.

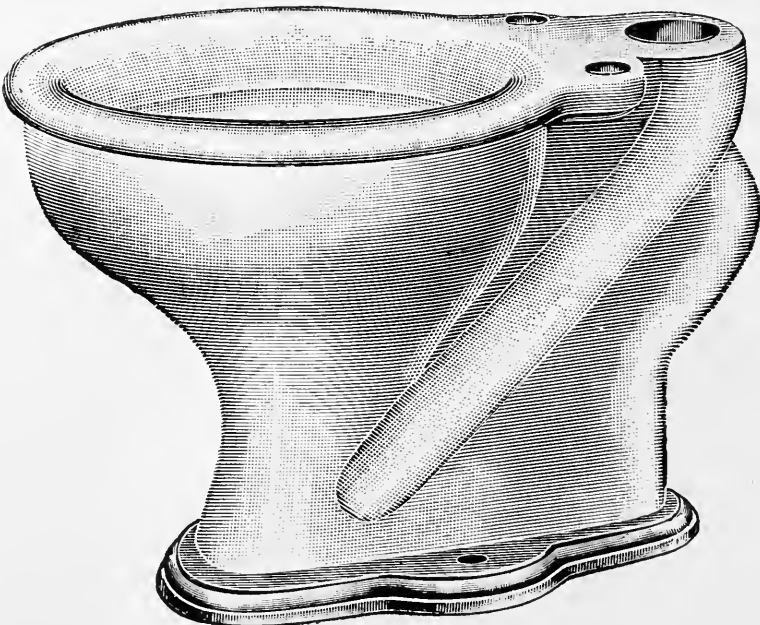
The above made with or without vent.

EMBOSSED SYPHON JET.



Measurements over all .....	22½ inches.
From Wall to Center of Outlet .....	11 "
Diameter at top, Outside .....	14x16 "
Price, each .....	\$18.70
Add for Coupling .....	1.00

PLAIN SYPHON JET.



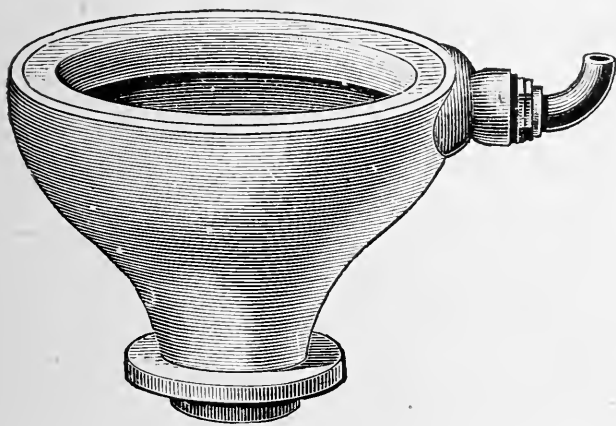
Measurements over all .....	22½ inches
From Wall to Center of Outlet .....	11 "
Diameter at top, Outside .....	14x16 "
Price, each .....	\$17.70
Add for Coupling .....	1.00

HOPPER CLOSETS.



TALL EARTHENWARE HOPPERS.

Oval Flushing Rim.....	\$6.50
“ “ “ with Seat Vent.....	6.75
“ “ “ “ Hub “ .....	7.00
Round “ “ .....	5.00
“ “ “ with Seat Vent.....	5.25
“ “ “ “ Hub “ .....	5.50
Add for Couplings.....	.75
Add “ Spud .....	.75



SHORT EARTHENWARE HOPPERS,  
WITH FLUSHING RIM.

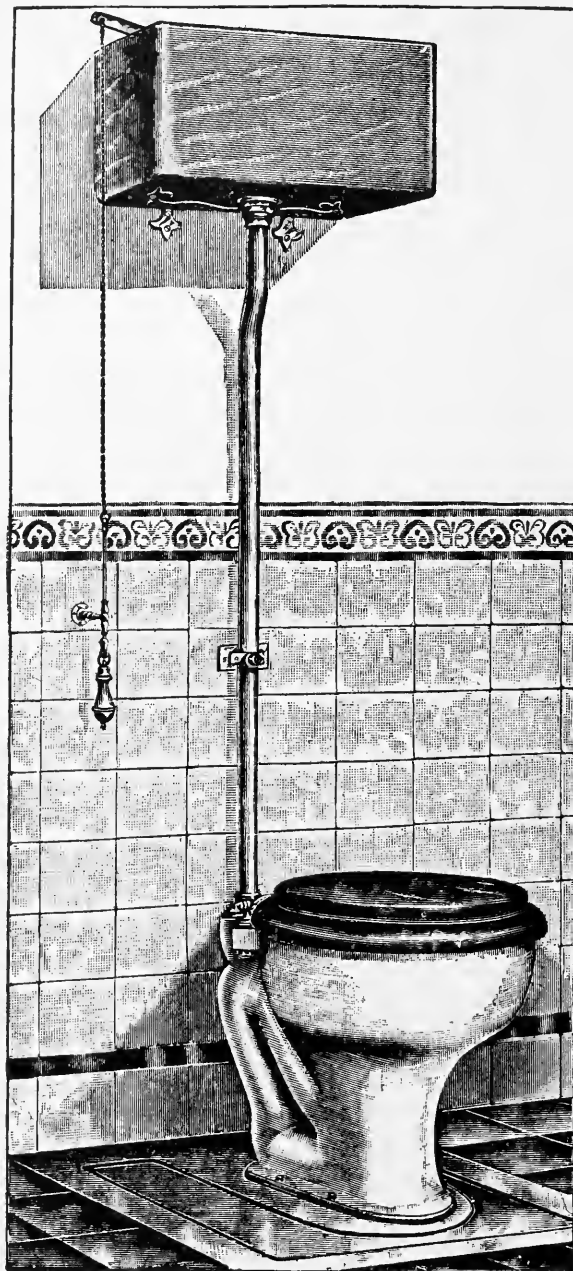
Oval.....	\$3.50
“ with Seat Vent.....	3.75
Round .....	2.50
“ with Seat Vent .....	2.75
Add for Coupling.....	.75
Add “ Spud.....	.75

SHORT OVAL FLUSHING RIM  
ENAMELED IRON  
HOPPER.

With Wood Rim and S Trap,  
complete.....each \$5.00

With Iron Tank and Supply  
Pipe as shown in apparatus  
No. 7, add to above list..... 8.00





### WATER CLOSET APPARATUS No. 4.

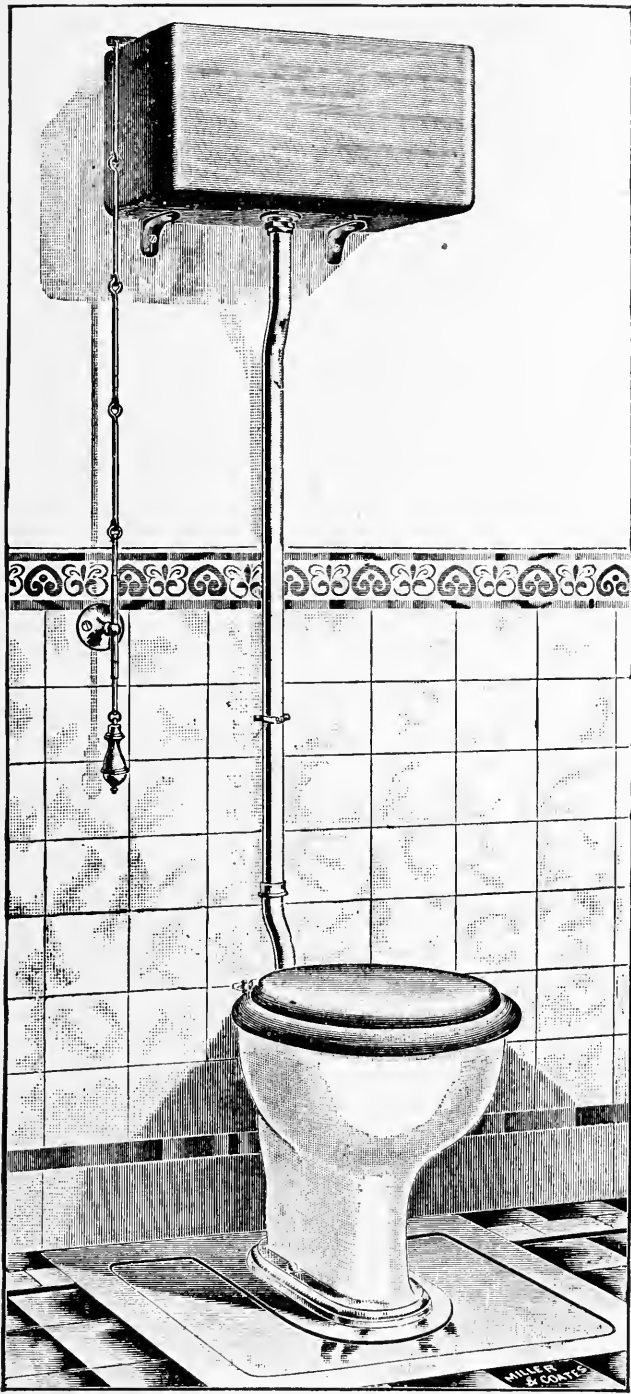
Improved Syphon Jet Closet, with 10 gall. Cabinet Finish, Oak

Syphon Tank, Seat to attach to Bowl, N. P. Flush Pipe and N. P.

Slip Joint Connection complete as shown (without floor slab) -----\$33.00

For Embossed Bowl add to list----- 1.00

For Nickel Plated Supply Pipe add to list..----- 2.50



WATER CLOSET APPARATUS No. 5.

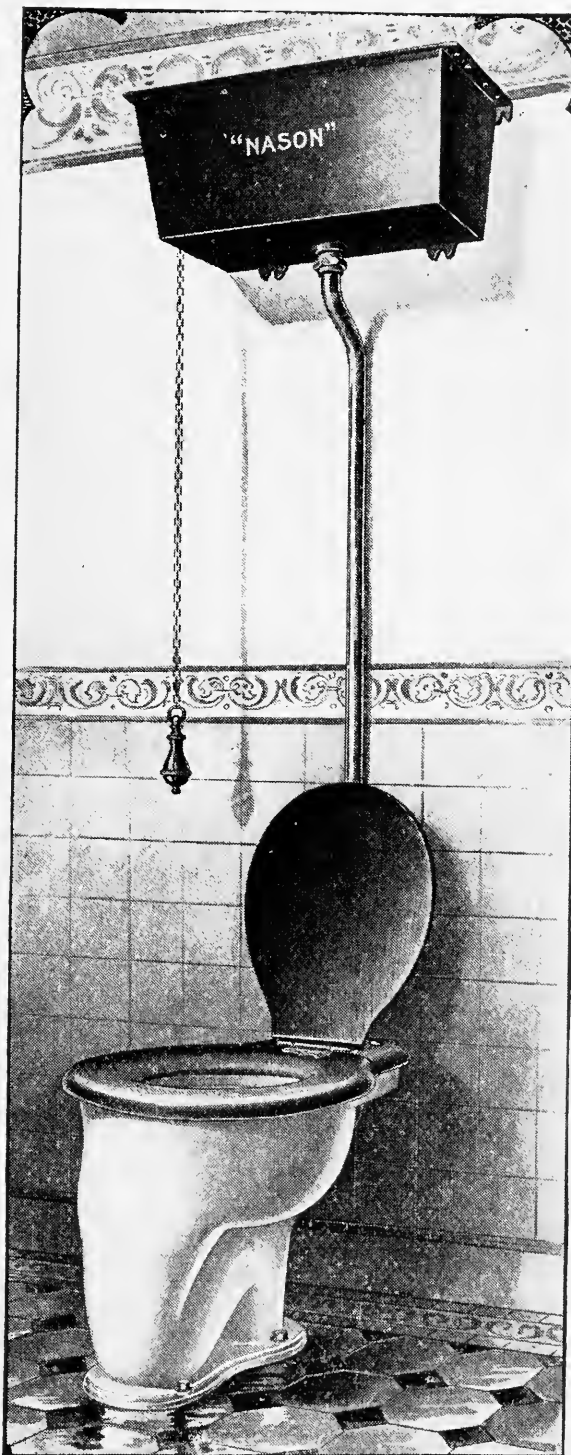
Wash Down Syphon Hopper, with 8-gallon Cabinet Finish Oak Syphon  
Tank, Seat to attach to Bowl, N. P. Flush Pipe and N. P. Slip Joint  
connection, complete as shown (without floor slab).....\$28.00  
For Nickel Plated Supply Pipe add to list..... 2.50



### WATER CLOSET APPARATUS No. 6.

Front Outlet Washout Closet, with 5½-gall. Rd. Cor. Oak Tank, Cage  
 Valve, Seat to attach to Bowl, N. P. Flush Pipe and Rubber  
 Elbow, complete as shown (without floor slab)-----\$25.00  
 If Flush Pipe is not wanted, deduct----- 4.00

## NASON WASHOUT SYSTEM.



WATER CLOSET APPARATUS No. 7.

Front Outlet Washout Closet with Seat Attachment, Cone Syphon Iron  
 Tank, Wrought Iron Flush Pipe and Rubber Elbow, Hardwood  
 Oak Seat and Cover, complete as shown .....\$18.00





### WATER CLOSET APPARATUS No. 8.

Front Outlet Washout Closet, with 5½-Gall. Copper-lined Plain Pine  
 Tank, Cage Valve, Oak Seat, Back and Cover, Lead Flush Pipe,  
 complete as shown.....\$19.50  
 If Lead Flush Pipe is not wanted, deduct..... 1.50

## LOW DOWN CLOSET APPARATUS.



APPARATUS No. 9.

A Plain Bowl Washdown-Syphon Closet; with Cabinet Finish Hardwood Seat and Cover, attached to Bowl with Nickel-plated Brass Post Offset Hinges; Cabinet Finish recessed Hardwood Low Down Cistern with Marble Top, Nickel-plated Push Button, Nickel-plated Supply Pipe and Escutcheon; Brass Floor Flange with rubber Gasket and Nickel-plated Bolts and Washers complete as shown .....\$30.00

For EMBOSSED Bowl add to the list ..... 1.00



APPARATUS No. 10.

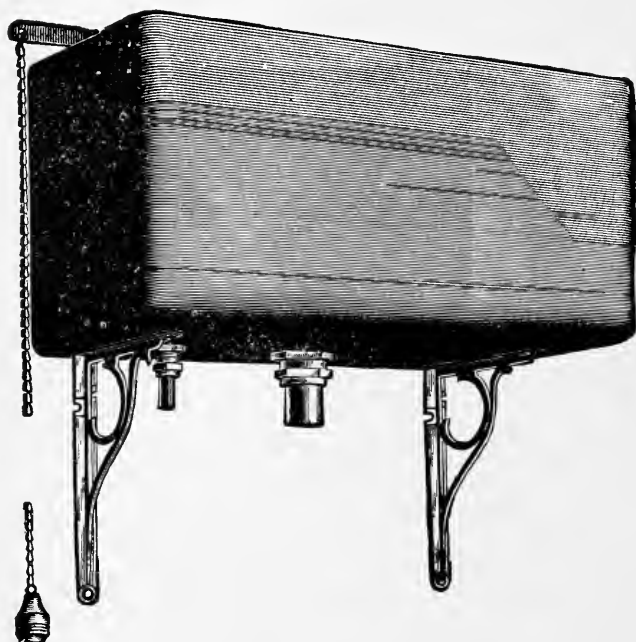
A Plain Bowl Syphon Jet Closet; with Cabinet Finish Hardwood Seat and Cover, attached to Bowl with Nickel-plated Bolts and Washers; No. 64 Round Corner Cabinet Finish Hardwood Low Down Cistern, with Marble Top, Nickel-plated Chain and Pull; Nickel-plated Supply Pipe with Escutcheon; Brass Floor Flange, Rubber Gasket and Nickel-plated Bolts and Washers, complete as shown .....\$33.00

For EMBOSSED Bowl, add to list ..... 1.00

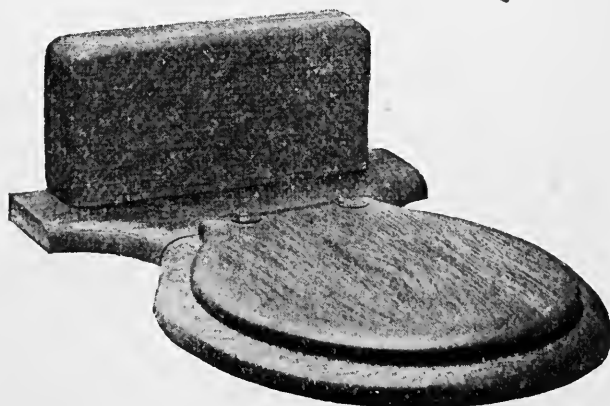
NOTE.—These closets can be furnished with tanks of Genuine Cherry, Quartered Oak, or Walnut at a slight additional cost.

## ROUND CORNERED TANKS AND SEATS.

(OAK FINISH.)



							Plain Valve.	Siphon Valve.
Round Cornered Tank,	17 x	8 x	10 ins. deep,	5 1/2 gal.	----		\$7.00	\$7.40
"	"	"	20 x	9 x 10 "	"	7 1/2 "	7.75	8.40
"	"	"	23 x	11 x 10 "	"	10 "	8.25	9.00



No. 6.	1 1/4-inch	Seat and Back	-----	\$2.80
" 8.	1 1/4	" " " " and Cover	-----	3.50

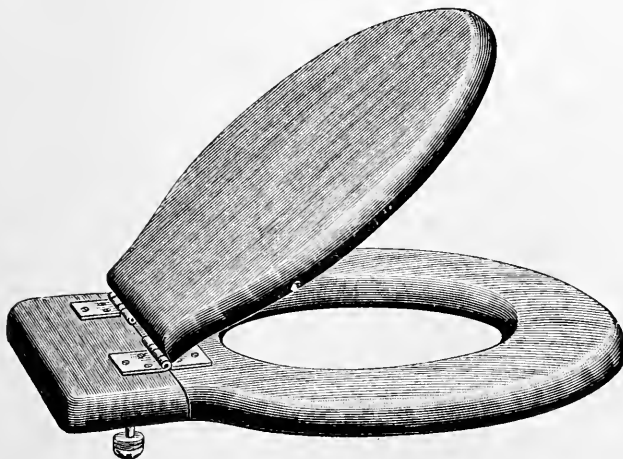
# HARDWOOD SEATS AND COVERS.

WITH ATTACHMENT.



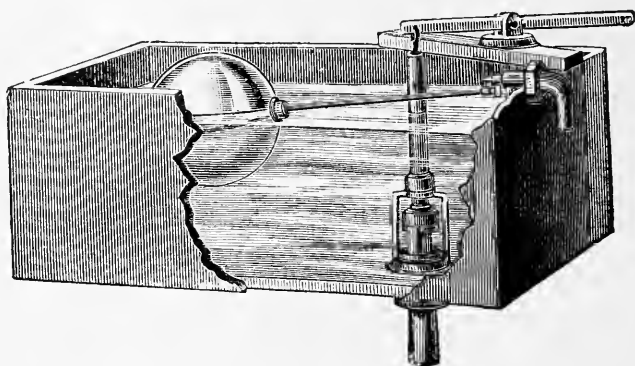
(Oak Finish.)

No. 20 Seat, 1¼ inch thick.....\$4.50



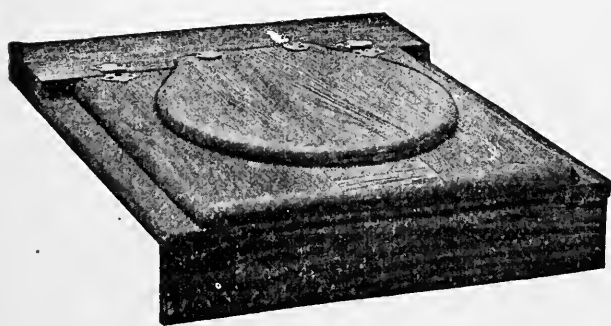
No. 18 Seat, 1¼ inch thick.....\$3.00

## PLAIN PINE TANKS, COPPER LINED.



		Plain Valve.	Syphon Valve.
Plain Pine Tank, 17x 8x 9 inches deep, 5 Gal. ....		6.00	6.40
“ “ “ 18x10x 9 “ “ 7 Gal. ....		6.65	7.30
“ “ “ 23x11x10 “ “ 10 Gal. ....		7.10	7.85

## HOPPER SEATS.



No. 10.



No. 2 Legs.

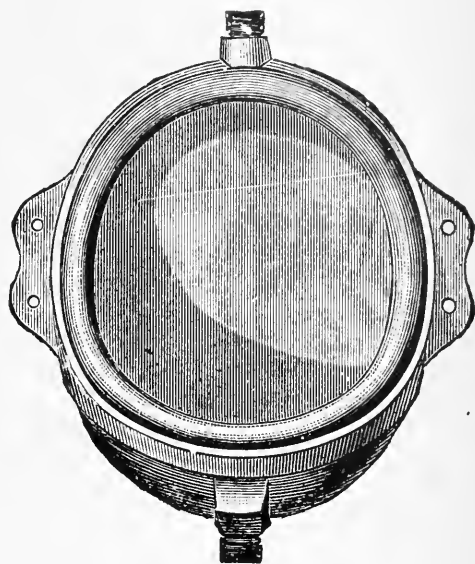
No. 10 Hopper Seat .....	2.50
Add for No. 2 Legs as shown .....	.50

Above seat is slotted to take Enameled Drip Tray, if desired.

# EARTHENWARE URINALS.

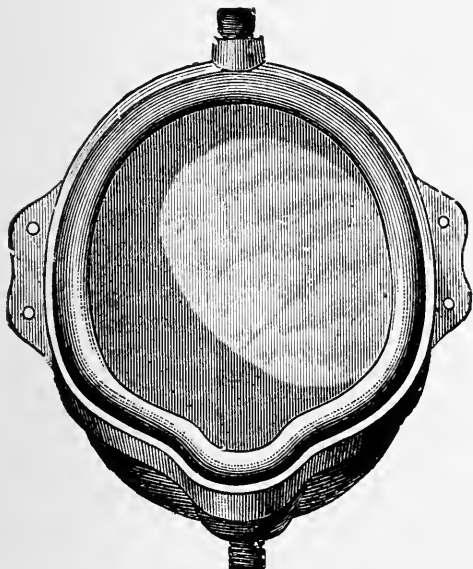
## ROUND URINALS.

	No. 1.	No. 2.	No. 3.
	Large.	Medium.	Small.
Size .....	15 x 18	12 x 15	11½ x 14
Price, American.....	8.00	6.00	5.00



## CORNER URINALS.

	No. 1.	No. 2.	No. 3.
Size.....	12 x 12	11 x 11	10¼ x 11¼
Without Lip.....	8.00	6.00	5.00



## LIP URINALS.

	No. 1.	No. 2.	No. 3.
	Large.	Medium.	Small.
Size.....	15 x 18	12 x 15	11½ x 14
Price, American ....	10.00	8.00	7.00

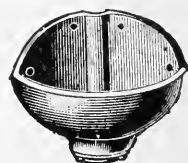
## CORNER LIP URINALS.

	No. 1.	No. 2.	No. 3.
Size .....	12 x 12	11 x 11	10¼ x 11¼
With Lip.....	10.00	8.00	7.00

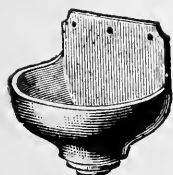
## IRON CORNER URINALS.

With or without opening behind for pipe.

No.	Sizes.	Plain.	Galvanized.	Enameled.
1	9	1.00	1.70	2.25
2	10	1.10	1.85	2.40
3	11	1.20	2.00	2.50
4	12	1.25	2.25	2.75

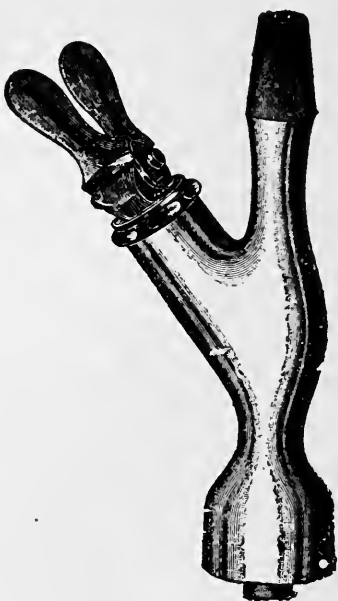


## IRON HALF ROUND URINALS.



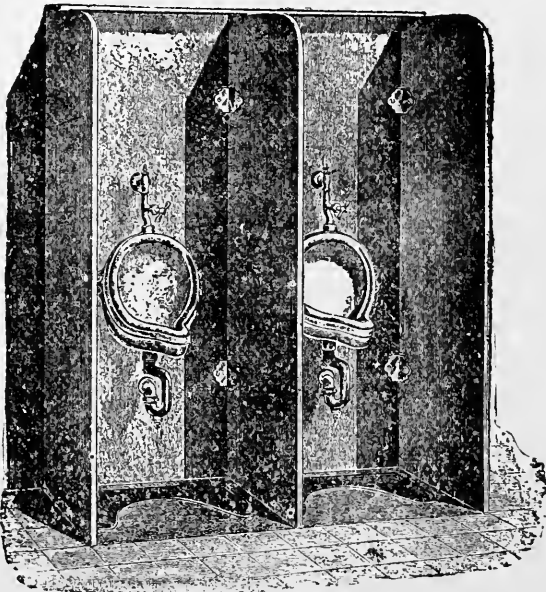
No.....	1	2
Size inches on Back.....	12	15
Plain.....	1.00	1.30
Galvanized .....	2.00	2.50
Enameled .....	2.50	3.00

URINAL COCKS AND STALLS.



COMPRESSION URINAL COCK.		SELF-CLOSING URINAL COCK.		
1/2 inch. Per Doz.	Finished.	Nickel Plated.	Finished.	Nickel Plated.
	27.00	33.00	36.00	41.00
			40.00	45.00
			54.00	60.00

URINAL STALL.  
WITH AUTOMATIC FLUSH TANK.



Two Stall Urinal, 5 feet 6 inches high. Stalls, 24 inches wide centres and 19 inches deep. Ends and partitions, 7/8 inch thick, and finished both sides. Back, 7/8 inch thick. Base, 2 inches thick, countersunk, and with drip drain and strainer. Nickel Plated Corner Clamps. Nickel Plated Brass on Plain Brackets. Urinal Traps. Nickel Plated Inlet Connections. Plain Varnished Tank.

Complete as described, Slate, 2 Stalls.....	\$135.00
“ “ “ “ 3 “ .....	195.00
“ “ “ “ in Italian Marble, 2 Stalls.....	155.00
“ “ “ “ “ “ 3 “ .....	225.00
Add if with Finished Hardwood Tank.....	1.50
“ “ “ Nickel Plated Connections from Tank.....	Special.
Stalls furnished in other dimensions than those given. Prices on application.	





## BALL COCKS AND COPPER BALLS.

### FOSTER'S HIGH PRESSURE F. P. BALL COCK.

Fig. A. Top Connection--- } Lead or Iron Pipe Connections,  
 Fig. B. End Connection--- } \$30.00 per doz.  
 Fig. C. Bottom Connection

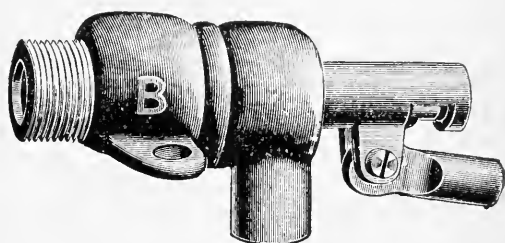
Nickel-Plated Nuts, Couplings and Tail Pieces, extra.

$\frac{1}{4}$  inch Copper Floats and Rods-----\$6.00 per doz.

### BIRKERY HIGH PRESSURE BALL COCK.

No. 1, for top, bottom or side supply, at \$15.00 per dozen. This is the regular size for ordinary closet tank use and has shank threaded for  $\frac{3}{4}$ -inch Iron Pipe and Tail Pieces plain for Lead Pipe, also furnished with Tail Pieces threaded male for  $\frac{1}{2}$ -inch, and female for  $\frac{3}{8}$ -inch Iron Pipe when ordered, without extra charge.

No. 2, for top, bottom or side supply, at \$7.50 per dozen. These Cocks are made with shank threaded for  $\frac{1}{2}$ -inch Iron Pipe, with tail pieces for lead pipe, also furnished with Tail Pieces threaded male for  $\frac{3}{8}$ -inch Iron Pipe when so ordered.

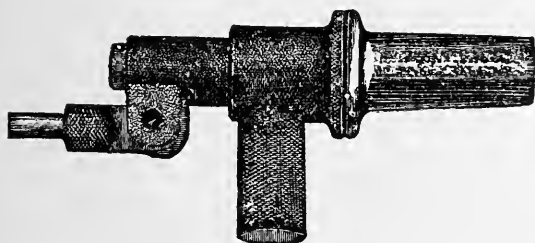


The No. 1 Cock can also be furnished as follows.

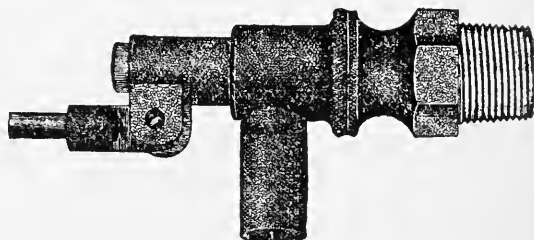
Size, Iron Pipe, inches.....	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	3
Price, per dozen.....	36.00	51.00	72.00	96.00	180.00

### IMPROVED BALL COCKS--FOR CLOSET TANKS.

For Lead Pipe.



For Iron Pipe.



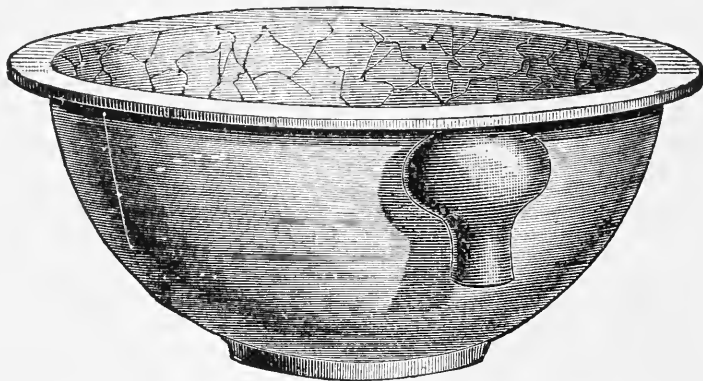
Size, inches.....	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	3	4
Price, per dozen....	12.00	14.00	20.00	34.00	56.00	80.00	150.00	400.00	800.00



### COPPER BALLS.

Size.....	4	5	6	7	8	10	12
Price, per dozen.....	4.50	6.00	7.00	10.50	80c. per pound.		

WASH BASINS.



COMMON OVERFLOW, MARBLED AND WHITE.

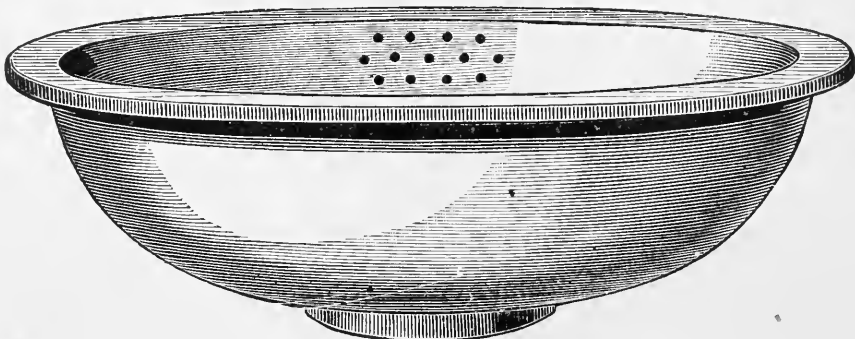
Outside Diameter, inches .....	12	13	14	15	16
American .....	\$1.00	1.00	1.00	1.50	2.00
American, without Overflow .....	1.00	1.00	1.00	1.50	2.00



PATENT OVERFLOW BASINS.

Outside Diameter, inches .....	12	13	14	15	16
Price .....	\$1.25	1.25	1.25	2.00	2.50

OVAL WASH BASINS.



COMMON OVERFLOW, MARBLED AND WHITE.

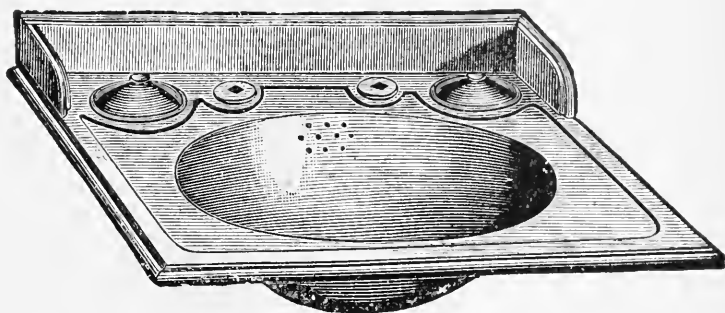
Sizes .....	14 x 17	15 x 19	16 x 21
Oval Basin, Common Overflow .....	\$2.50	3.50	4.50
“ “ no “ .....	2.50	3.50	4.50

PATENT OVERFLOW, MARBLED AND WHITE.

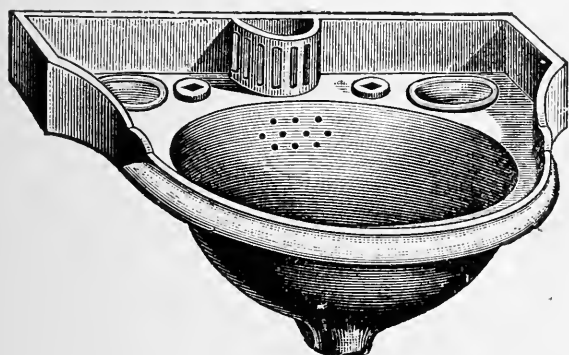
Sizes .....	14 x 17	15 x 19	16 x 21
Oval Basin, Patent Overflow .....	\$3.00	4 00	5.00
“ “ “ “ for Rubber Plug .....	3.50	4.50	5.50

## AMERICAN "MARBLED" COMBINED SLABS AND BASINS.

No. 3. American Patent  
Overflow Basin,  
11 inches inside...\$13.00



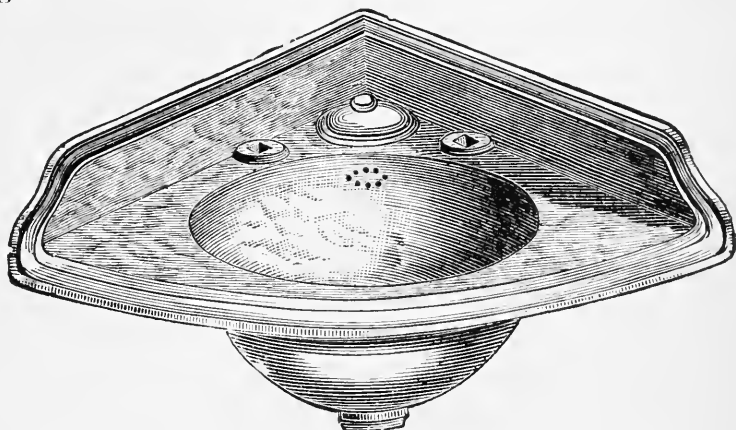
No. 3. Marbled, Square, 18 x 18 inches.



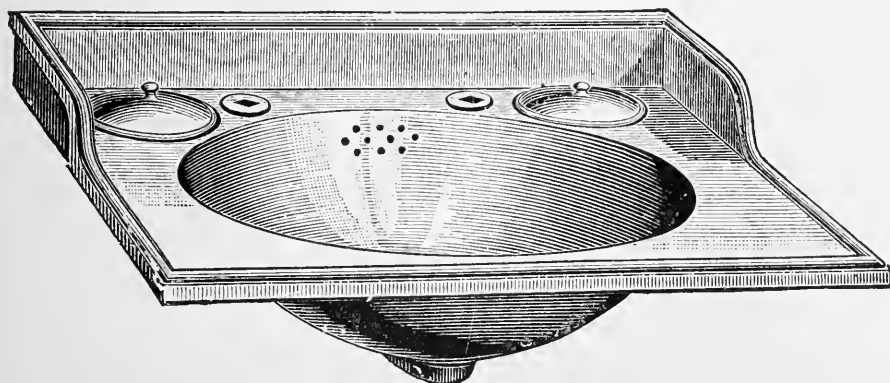
No. 10. Marbled or White,  
with Cock Holes .....\$11.60

No. 10. 18 inches long.

No. 1. American Patent  
Overflow Basin,  
11 inches inside...\$13.00



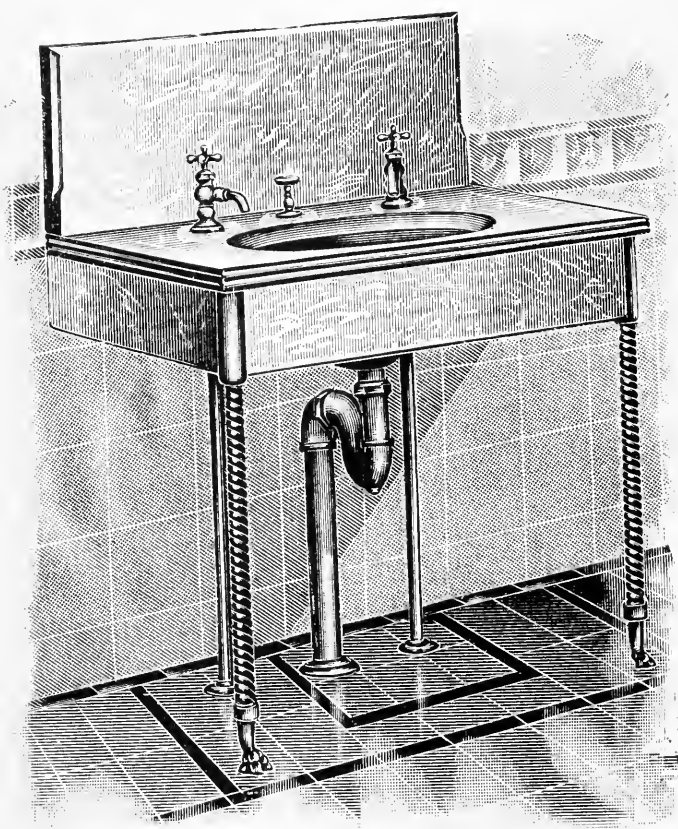
No. 1. American Marbled Corner, 19 x 19 inches.



No. 11. Patent  
Overflow  
Oval Basin,  
13x17 inches.  
Each.. \$19.70

Marbled, 18 x 24 inches.

## ITALIAN MARBLE LAVATORIES.



LAVATORY No. 1.

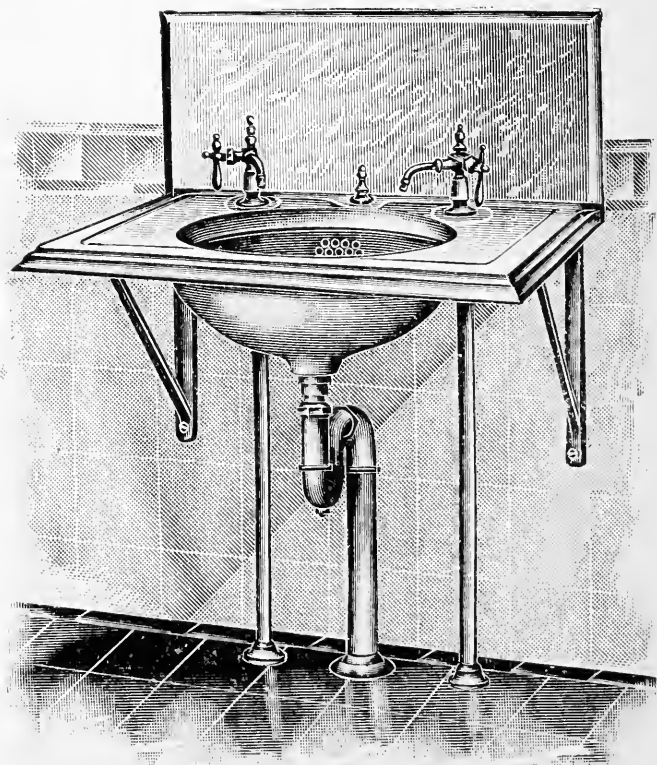
1 $\frac{1}{4}$  inch Italian Marble Slab, 30x20, 10 in. back; front and side aprons, 5 inches; 14x17 in. Oval P. O. Basin; Nickel-Plated 4-arm Comp. Basin Cocks, Chain Stay; 1 $\frac{1}{2}$  in. Nickel-Plated S. Trap, no vent; Nickel-Plated Supply Pipes and Rope Pattern Legs. Complete as shown, \$35.00

LAVATORY No. 2.

1 $\frac{1}{4}$  inch Italian Marble Slab, 30x20, 10 in. back; 14 inch P. O. Basin; Nickel-Plated Fuller Basin Cocks, Chain Stay; 1 $\frac{1}{2}$  in. N. P. S. Trap, no vent; Nickel-Plated Supply Pipes; Nickel-Plated Solid Brass Brackets. Complete as shown.....\$30.00

LAVATORY No. 3.

Same size as No. 2, with Nickel-Plated Iron Brackets, Lead Trap; no supply pipes, and No. 1 T. Handle Basin Cocks, Nickel-Plated. Complete as described.....\$15.00



“STANDARD” ENAMELED IRON LAVATORY.



PLATE 450 S.

“Standard” Enameled Iron Lavatory with Oval Bowl, Patent Overflow, Nickel-plated Brass Overflow Strainer, Waste Plug with Rubber Stopper, Nickel-plated Brass Soap Cup, Exterior Bronzed and with Bronzed Iron Brackets.

Dimensions: 16 x 20 inch Slab, Bowl 11 x 14 inches; 18 x 24 inch Slab, Bowl 12 x 15 inches; Height of Back, 12 inches.

Size 16 x 20, Complete with Faucets as shown.....	\$13.75
Without Faucets. ....	10.00
Size 18 x 24, Complete with Faucets as shown.....	15.75
Without Faucets.....	12.00
ENAMELED ALL OVER, WITH ENAMELED BRACKETS.	
Size 16 x 20, Complete with Faucets as shown.....	\$16.75
Without Faucets.. . . . .	13.00
Size 18 x 24, Complete with Faucets as shown.....	18.75
Without Faucets.....	15.00

“ STANDARD ”  
ENAMELED IRON LAVATORY.—Continued,



PLATE 476 S.

“Standard” Corner Enameled Iron Lavatory with Oval Bowl,  
Patent Overflow, Nickel-plated Brass Overflow Strainer,  
Waste Plug with Rubber Stopper and Nickel-plated  
Brass Soap Cup, Exterior Bronzed.

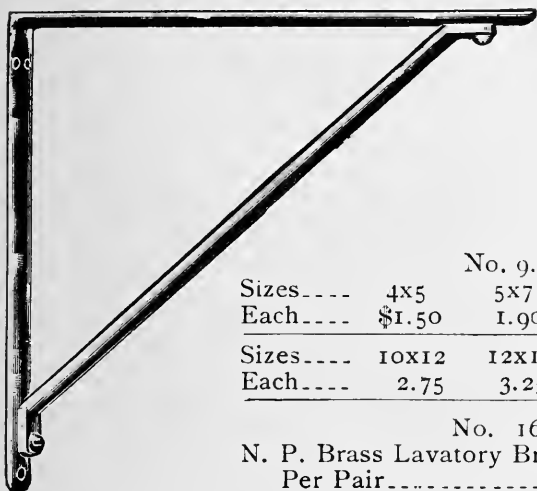
Dimensions: Length on side, 16 inches; Bowl, 11 x 14 inches; Height of Back, 6 inches; Wall to Centre of Waste, 10 inches; Centre to Centre of Faucets, 6 inches.

Complete with Faucets as shown.....	\$11.25
Without Faucets.....	7.50



# SOLID BRASS LAVATORY BRACKETS.

NICKEL PLATED.



No. 9.				
Sizes----	4x5	5x7	7x9	8x10
Each----	\$1.50	1.90	2.10	2.35
Sizes----	10x12	12x14	14x16	16x18
Each----	2.75	3.25	3.75	4.25

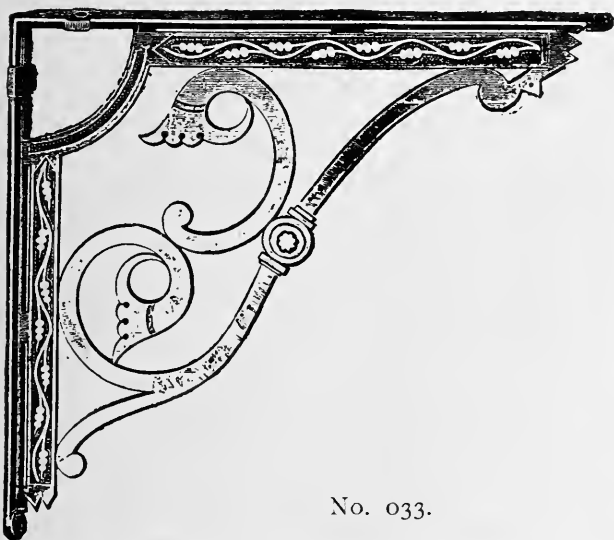
No. 160.	
N. P. Brass Lavatory Bracket, 16x18,	
Per Pair-----	\$2.80



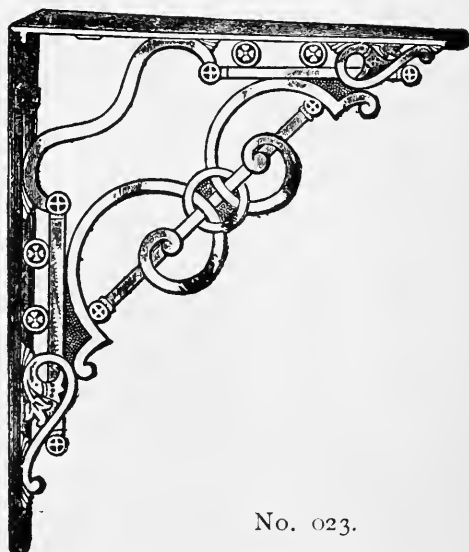
No. 9.

No. 160.

## LAVATORY BRACKETS. NICKEL FINISH ON IRON.



No. 033.



No. 023.

Size, Inches-----	4x5	7x9	8x10	16x18
Nickel Finish, per pair	.35	.50	.60	2.50

Size, Inches-----	4x5	7x9	8x10	16x18
Nickel Finish, per pair	.35	.50	.60	2.50



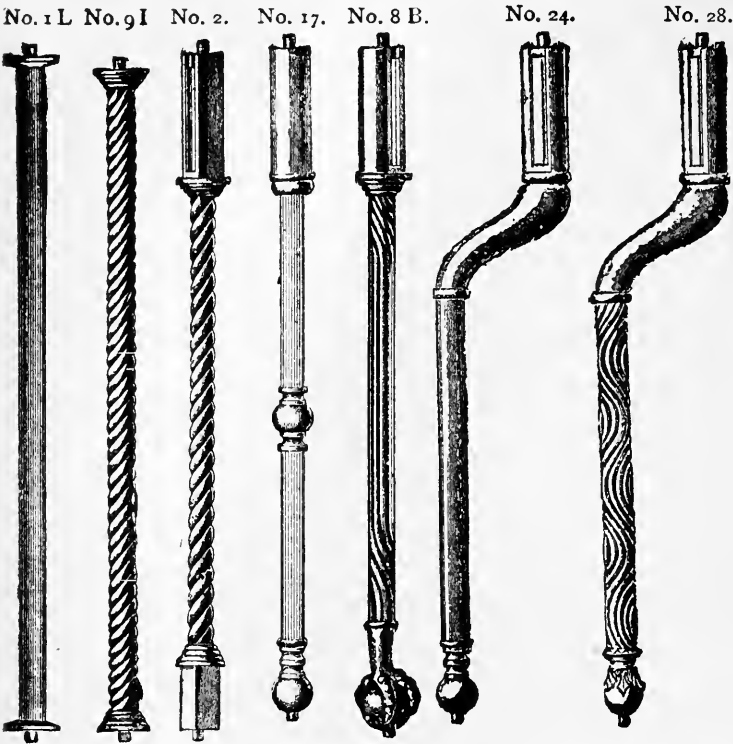
## ADJUSTABLE SINK BRACKETS.

COMPLETE WITH BOLTS.

		Per pair
No. 0.	Takes sink 12 to 15 inches wide---	\$0.50
No. 1.	" " 14 to 18 " " ---	.50
No. 2.	" " 18 to 23 " " ---	.70



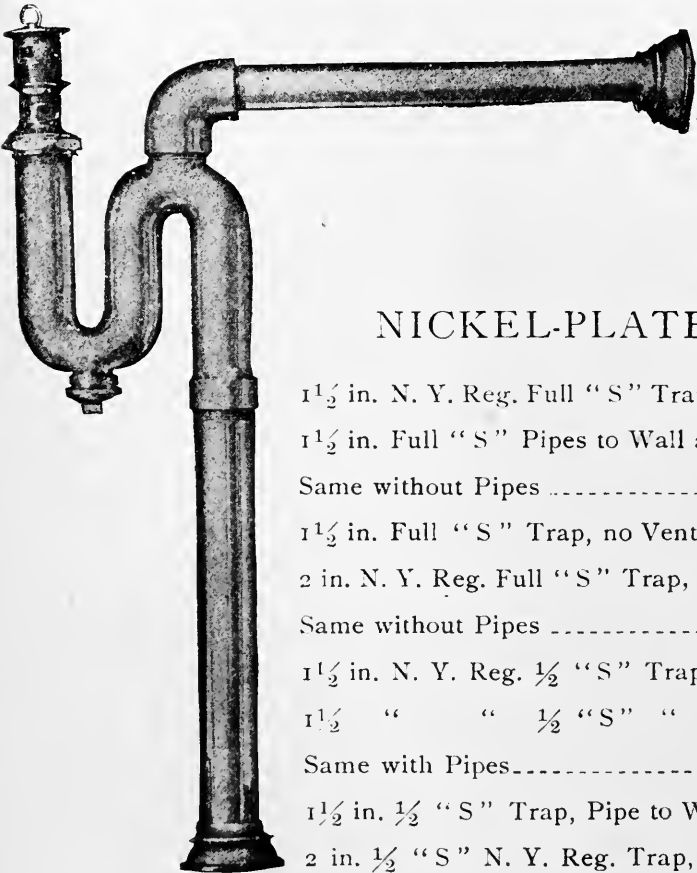
SOLID BRASS LAVATORY LEGS.



LIST PRICES PER PAIR.

No		Nickel Plated.
No 1 L.....		3.00
" 9 I.....		3.00
" 2.....		4.00
" 17.....		4.00
" 8 B.....		4.00
" 24.....		7.00
" 28.....		7.00

Apron Pockets,  
.70 each.

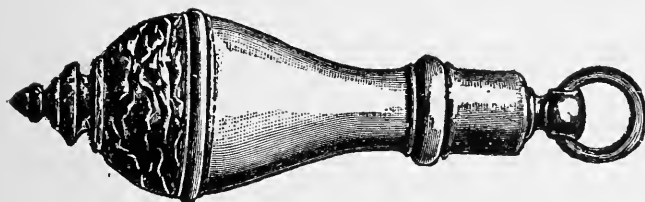


NICKEL-PLATED BASIN TRAPS.

1½ in. N. Y. Reg. Full "S" Trap, Pipes to Wall and Floor, N.P.	\$6.00
1½ in. Full "S" Pipes to Wall and Floor, N. P., Light.....	3.50
Same without Pipes .....	3.50
1½ in. Full "S" Trap, no Vent, Pipes to Floor, N. P., (Light)-	3.30
2 in. N. Y. Reg. Full "S" Trap, Pipes to Wall and Floor.....	10.50
Same without Pipes .....	6.50
1½ in. N. Y. Reg. ½ "S" Trap, no Pipe .....	2.50
1½ " " ½ "S" " Vented .....	3.50
Same with Pipes.....	6.00
1½ in. ½ "S" Trap, Pipe to Wall, N. P. (Light).....	2.70
2 in. ½ "S" N. Y. Reg. Trap, no Pipes.....	4.00

N. Y. Regulation Full  
S Trap with Pipes  
to Wall and Floor.

## CLOSET CISTERN PULLS.

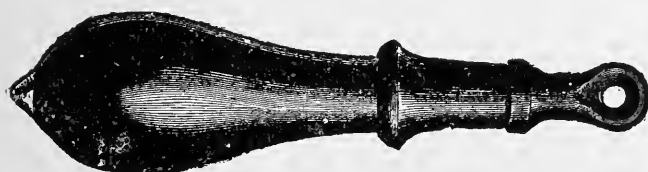
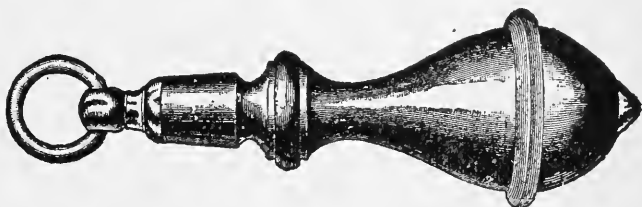


No. 1, CELLULOID.—WITH RUBBER  
BUFFER AND PLATED TIPS.

White.....	per doz.	\$7.00
Ivory.....	“	9.00
Ivory and Colored.....	“	12.00

No. 2, HARD WOOD.—WITH RUBBER  
BUFFER AND PLATED TIPS.

Cherry or Walnut.....per doz. \$4.00



No. 3, HARD WOOD.—WITH EBONY  
FINISH, JAPANNED TIPS.

Per dozen.....\$3.00

## JACK AND SAFETY CHAIN.

### IRON JACK CHAIN.

Nos.....	6	7	8	9	10	11	12
Per doz. yds.....	1.30	1.05	.95	.90	.85	.55	.44
Nos.....	13	14	15	16	17	18	19
Per doz. yds.....	.42	.40	.35	.30	.30	.28	.27
Nos.....	20	21	22	23	24		
Per doz. yds.....	.26	.25	.25	.25	.25		

### BRASS SAFETY CHAIN.

Nos.....	000	00	0	1	2	3
Per doz. yds.....	1.20	1.30	1.50	1.80	2.40	3.60

One dozen yards in a box.

## PACKINGS AND WASHERS FOR COMPRESSION BIBBS.



No. 8.



No. 10.



No. 00.

## BATH SPRINKLERS.



Polished Brass, per doz... \$8.00  
Nickel-Plated, “ --- 10.00



### COMMON RUBBER.

Size, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
For Cap, per 100	\$0.75	.75	.75	1.00	1.50
For Valve, “	.40	.40	.40	.50	.65

### BLACK RUBBER.

For Valve, per 100	1.25	1.25	1.38	1.50	2.00
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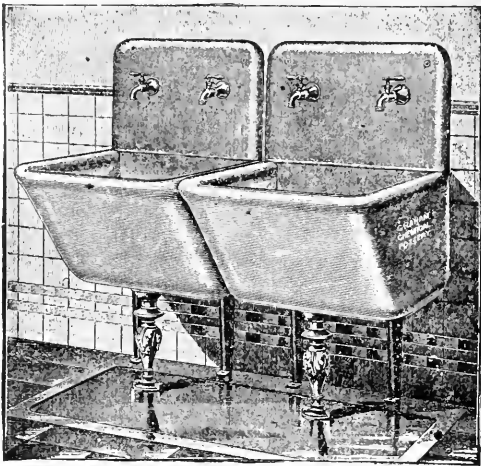
### VULCANIZED FIBRE.

For Valve, per 100	.50	.50	.50	.60	.75
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### BOSS WASHERS.

Per 100.....	.75	.75	.75	.75	1.00
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GRAHAM'S ROLL-RIM, VITRIFIED BROWN WASH-TUBS.



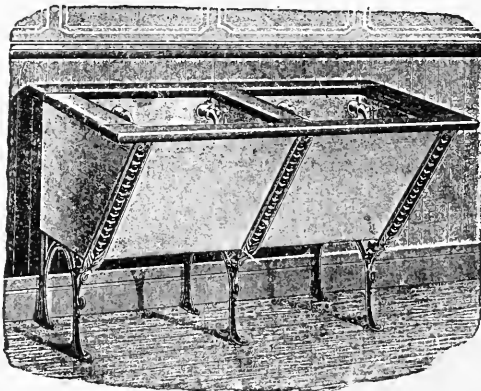
30 inch size, Set of 2 Tubs.....	\$27.50	24 inch size, Set of 2 Tubs.....	\$26 00
30 " " " " 3 " .....	41.25	24 " " " " 3 " .....	39.00
30 " " " " 4 " .....	55.00	24 " " " " 4 " .....	52.00

OUTSIDE DIMENSIONS :

Length, 30 inches.	Width, 24½ inches.	Depth, 17 inches.
" 24 "	" 24½ "	" 17 "

Prices include Bronzed Iron Standards, and Back of Same Material and Glaze.

GRAHAM'S WHITE PORCELAIN AND BROWN GLAZED WASH-TUBS.



PRICES WHITE PORCELAIN TUBS.

Set of 2 Tubs, Galvanized Iron Legs and Ash Frame.....	\$25.00
" 3 " " " " " " " " .....	37.50
" 4 " " " " " " " " .....	50.00

PRICES VITRIFIED BROWN GLAZED TUBS.

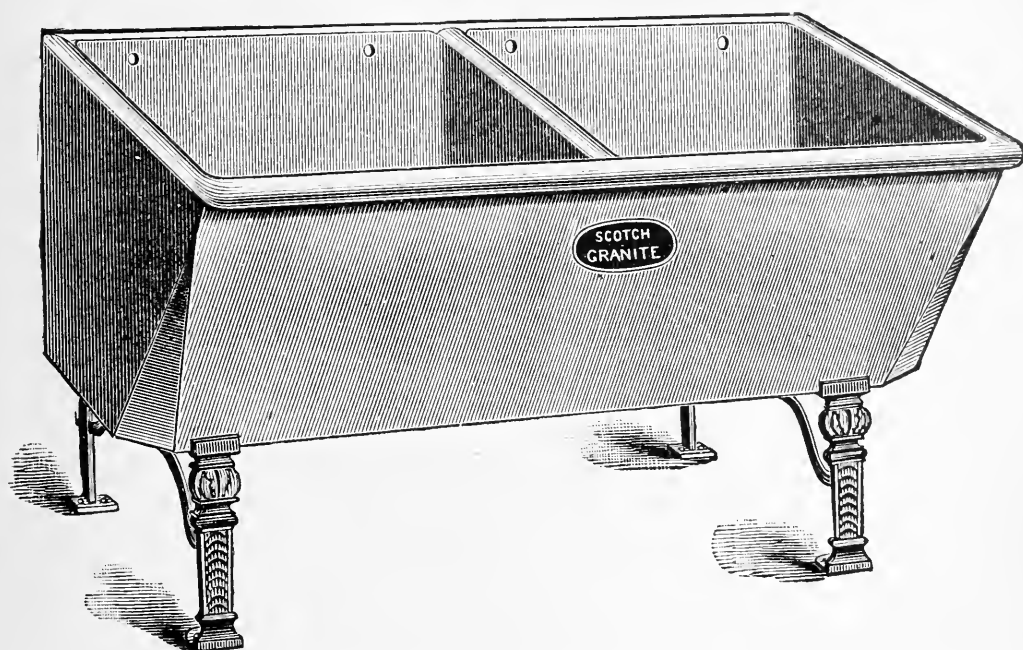
Set of 2 Tubs, Bronzed Iron Legs and Ash Frame.....	\$16.25
" 3 " " " " " " " " .....	24.35
" 4 " " " " " " " " .....	32.50

OUTSIDE DIMENSIONS, WHITE PORCELAIN AND BROWN GLAZED TUBS.

Length, 28½ inches.	Width, 24½ inches.	Depth, 16½ inches.
" 26 "	" 24½ "	" 16½ "
" 24 "	" 24½ "	" 16½ "

All Tubs subject to Extra Charge for Crating.

## SCOTCH GRANITE ROLL RIM LAUNDRY TUB.



Single.....	25 x 24,	Tub and Plug.....	\$8.50,	including	Cover and	Legs, \$10.00
".....	27 x 24,	".....	10.00,	"	"	11.50
".....	31 x 24,	".....	11.50,	"	"	13.00
2 Part.....	48 x 22,	".....	15.00,	"	"	17.00
".....	48 x 24,	".....	15.00,	"	"	17.00
".....	53 x 24,	".....	17.00,	"	"	19.00
".....	60 x 24,	".....	21.00,	"	"	23.00
3 Part.....	72 x 24,	".....	25.00,	"	"	28.00

## GRAHAM'S ROLL RIM VITRIFIED BROWN SLOP SINKS.



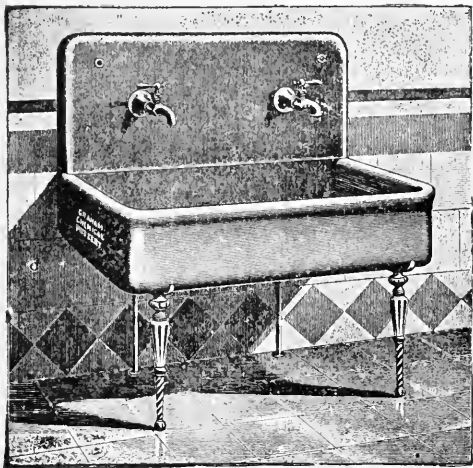
With Back of same Material and Glaze, bronzed Iron Trap Standard and Nickel Plated Strainer.

20 x 16 x 12 deep.....	\$15.00
22 x 18 x 12 ".....	16.50
24 x 20 x 12 ".....	19.00

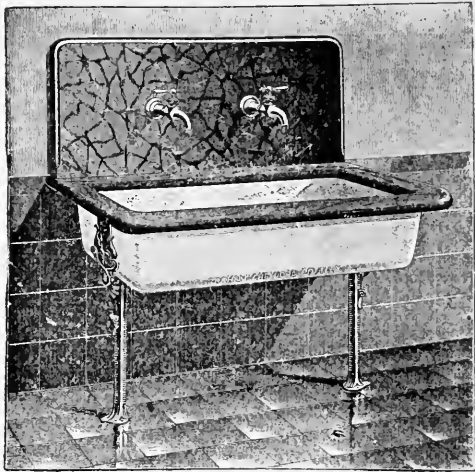
N. Y. Reg. S Trap Standard for lead, S or  $\frac{1}{2}$ S Trap Standard for Iron, furnished in place of Trap shown, at same price.

All Sinks subject to Extra Charge for Crating.

GRAHAM'S KITCHEN AND PANTRY SINKS.



(ROLL RIM, BROWN.)



(WHITE PORCELAIN.)

ROLL-RIM VITRIFIED BROWN KITCHEN SINKS.

24 x 18 x 8 with Bronzed Iron Legs	\$7.50	Add for Back	\$2.50	} Cocks and Supply Pipes Extra.
30 x 18 x 8 " " " "	9.00	" " "	3.25	
36 x 22 x 8 " " " "	10.50	" " "	4.00	
42 x 22 x 8 " " " "	13.25	" " "	4.75	
48 x 22 x 8 " " " "	16.75	" " "	6.00	

WHITE PORCELAIN KITCHEN SINKS.

30 x 22 x 8 with Galvanized Iron Legs and Ash Frame	\$11.25	Sink only	\$8.00
36 x 22 x 8 " " " "	13.75	" "	10.50
42 x 22 x 8 " " " "	16.25	" "	12.50
48 x 24 x 9 " " " "	24.25	" "	19.50

Cocks and Sink Back Extra.

WHITE PORCELAIN PANTRY SINKS.

24 x 18 x 8 Sink only, no Fittings	\$5.00	30 x 18 x 11 Sink only, no Fittings	\$8.00
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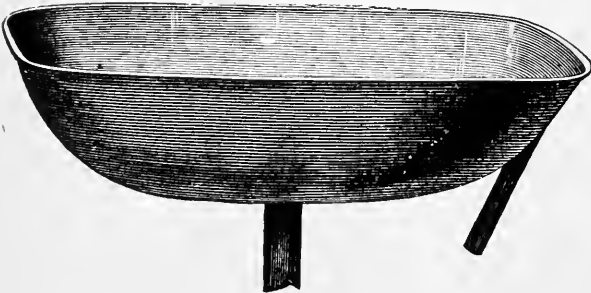
All Sinks subject to Extra Charge for Crating.

WHITE PORCELAIN BUTLERS' PANTRY SINK.  
NO FITTINGS.

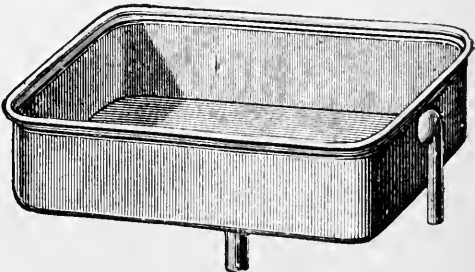
24 x 18 x 8	\$5.00	30 x 18 x 11	\$8.00
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OUTSIDE MEASURES.

COPPER SINKS.



Oval Bottom.

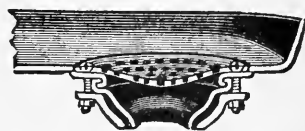
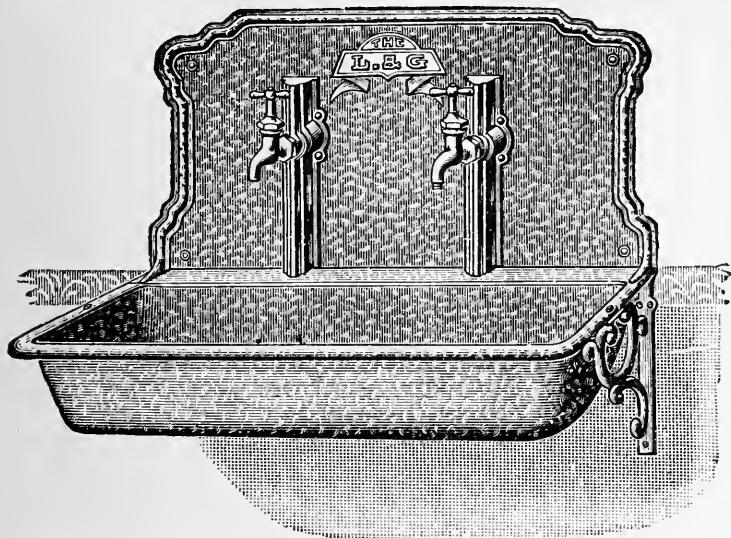


Square Bottom.

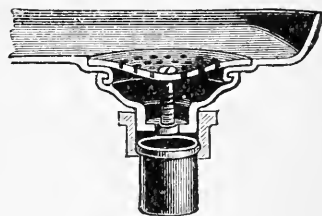
COPPER PANTRY SINKS.

Size	12 x 18	12 x 20	14 x 16	14 x 20	14 x 24	16 x 24	16 x 30	18 x 30
Square Bottom	\$4.50	\$5.00	\$4.50	\$6.00	\$7.00	\$8.00	\$10.00	\$11.00
Oval Bottom	6.00	6.50	6.00	7.50	9.00	10.00	12.00	13.00

# SEAMLESS WROUGHT STEEL KITCHEN SINKS AND BACKS.



Cast Iron Coupling.



Brass Strainer Coupling.

## SINKS WITHOUT BACKS, WITH CAST IRON COUPLINGS, TURNED EDGES.

(Order by Number only. State Finish Required.)

No.	01	01½	02	02½	03	04	05	06
Width, inches	16	18	18	20	18	20	20	20
Length, inches	24	24	30	20	36	30	36	40
Depth, inches	6	6	6	6	6	6	6	6
Plain	each, 1.80	2.15	2.35	2.30	2.85	2.85	3.45	4.30
Painted	inside and out, 1.95	2.40	2.70	2.55	3.25	3.25	4.00	4.30
Galvanized	" 2.70	3.05	3.55	3.30	4.30	4.30	5.10	5.90
Blue Enameled	" 3.25	3.85	4.30	4.10	4.80	4.80	5.35	6.95
Agate " (Gray)	" 4.80	5.35	5.80	5.60	6.70	6.70	7.75	8.85
Crystal " (Light Gray)	" 5.10	5.65	6.10	5.90	6.95	6.95	8.05	9.15
White " (Blue Outside)	" 5.90	6.40	7.60	6.65	9.45	9.45	11.55	12.65

For Sinks with Plug Strainers and Rubber Stoppers add 25c. to the list.

For Sinks with Cast Iron Couplings threaded for Iron Pipe add 15c. to the list.

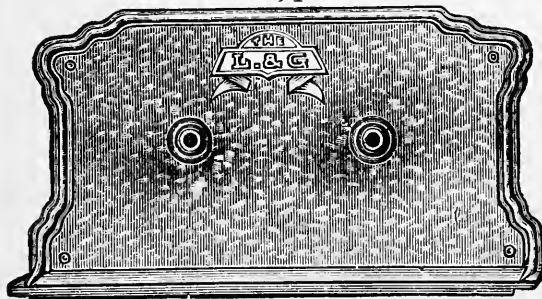
## SINKS WITHOUT BACKS, WITH BRASS STRAINER COUPLINGS.

(Order by Number only. State Finish Required.)

No.	010	015	020	025	030	040	050	060
Width	16	18	18	20	18	20	20	20
Length, inches	24	24	30	20	36	30	36	40
Depth, inches	6	6	6	6	6	6	6	6
Plain	each, 2.50	2.90	3.10	3.05	3.60	3.60	4.20	5.00
Painted	inside and out, 2.70	3.15	3.45	3.30	4.00	4.00	4.75	5.00
Galvanized	" 3.45	3.80	4.30	4.05	5.00	5.00	5.85	6.60
Blue Enameled	" 4.00	4.50	5.00	4.75	5.50	5.50	6.10	7.70
Agate " (Gray)	" 5.65	6.10	6.55	6.40	7.45	7.45	8.50	9.60
Crystal " (Light Gray)	" 5.85	6.40	6.90	6.65	7.70	7.70	8.80	9.85
White " (Blue Outside)	" 6.65	7.15	8.40	7.40	10.20	10.20	12.30	13.35

## WROUGHT STEEL SINK BACKS, WITH AND WITHOUT AIR CHAMBERS.

Threaded for ¾ inch Bibbs.



(Order by Number only. State Finish Required.)

No.	With One Air Chamber.				With Two Air Chambers				Without Air Chambers.			
	4	5	7	9	8	10	20	30	0	1	2	3
Width, inches	20	24	30	36	20	24	30	36	20	24	30	36
Plain	each, 3.30	3.40	3.75	3.90	5.30	5.40	5.75	5.90	1.15	1.25	1.60	1.70
Painted	" 3.40	3.75	4.05	4.35	5.40	5.75	6.05	6.35	1.35	1.60	1.90	2.20
Galvanized	" 3.85	4.15	4.65	5.15	5.85	6.15	6.65	7.15	1.55	1.85	2.30	2.75
Blue Enameled	" 4.65	5.55	6.55	7.80	6.65	7.55	8.55	9.80	2.10	2.75	3.55	4.80
Agate " (Gray)	" 4.85	5.75	6.75	8.00	6.85	7.75	8.75	10.00	2.50	3.20	4.20	5.70
Crystal " (Light Gray)	" 4.85	5.75	6.75	8.00	6.85	7.75	8.75	10.00	2.50	3.20	4.20	5.70
White	" 6.15	7.15	8.65	10.55	6.85	9.15	10.65	12.55	3.20	4.20	5.80	8.25

Backs with two holes always supplied unless ordered with one.

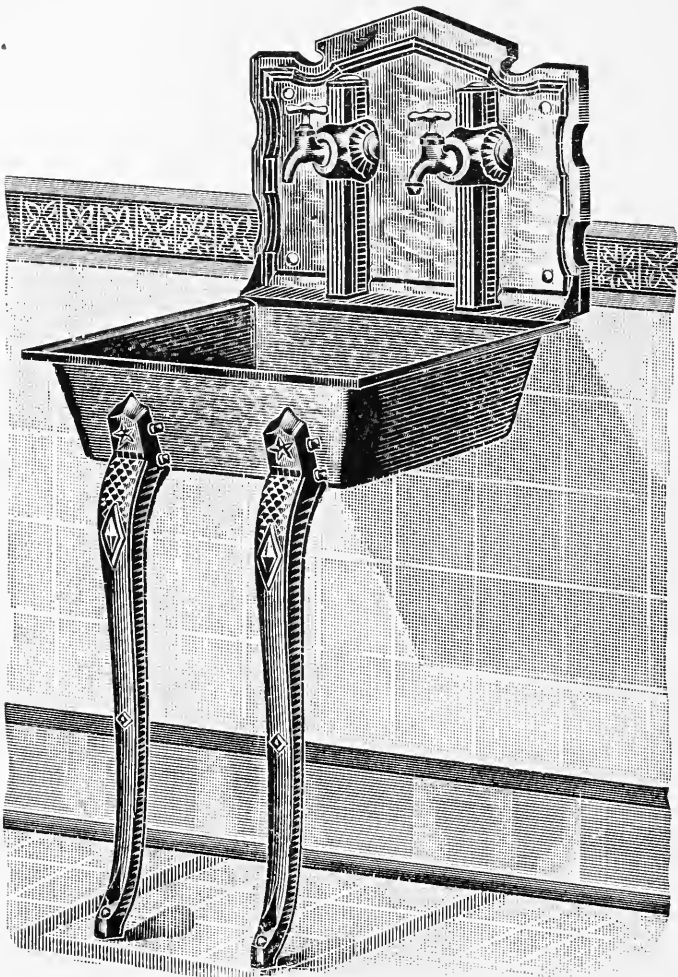
Nickel Plated Air Chambers, List 50c. Each Extra.

List prices Adjustable Sink Brackets, page 165.

Faucets not included in any of above Lists.



KITCHEN SINK WITH NOVELTY BACK.



LIST PRICES OF NOVELTY SINK BACKS.

Length.....inches	16	18	20	22	23	24	25	27	28
Plain .....	\$1.35	1.45	1.50	1.60	1.65	1.75	1.80	1.95	2.05
Galvanized .....	2.35	2.35	2.50	2.75	2.95	3.05	3.15	3.50	3.75
Enameled .....	3.50	3.50	3.50	3.65	3.75	3.95	4.50	4.75	5.00

Length.....inches	30	32	34	36	38	41	42	48
Plain .....	\$2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.50
Galvanized .....	4.25	4.50	5.00	5.25	5.75	6.25	6.25	7.25
Enameled .....	5.25	5.50	6.00	6.25	6.75	7.25	7.25	8.25

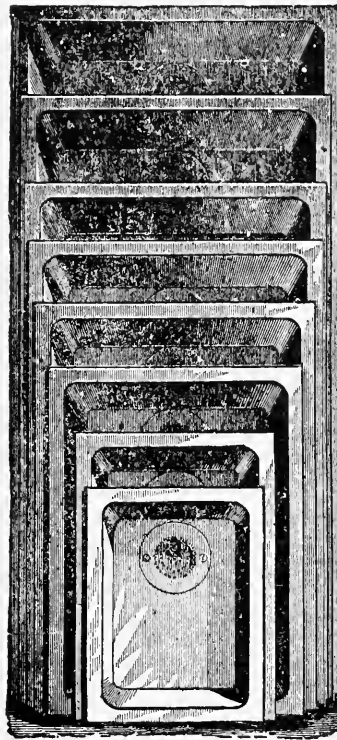
Above lists are for backs with two cock holes. If wanted with only one cock hole list is twenty-five cents less.

Please note that above list prices are for Novelty Backs only.

To arrive at the list price of complete sinks as shown in cut, add list price of sink of size wanted as per top of page 171 and sink legs as per page 172.



SQUARE  
CAST IRON  
SINKS.

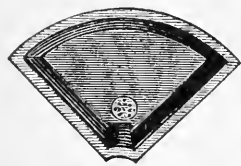


SQUARE  
CAST IRON  
SINKS.

Length.	Width.	Depth.	Plain.	Galvanized.	Enameled.
16 inch.	12 inch.	6 inch.....	\$1.10	\$2.30	\$4.50
16 inch.	16 inch.	6 inch.....	1.60	3.25	5.25
18 inch.	12 inch.	6 inch.....	1.25	2.60	4.75
18 inch.	18 inch.	6 inch.....	1.80	3.80	6.00
20 inch.	12 inch.	6 inch.....	1.50	3.10	5.25
20 inch.	14 inch.	6 inch.....	1.50	3.20	6.00
20 inch.	20 inch.	6 inch.....	1.95	4.20	6.75
22 inch.	14 inch.	6 inch.....	1.60	3.30	6.00
23 inch.	15 inch.	6 inch.....	1.70	3.40	6.25
24 inch.	14 inch.	6 inch.....	1.70	3.75	6.25
24 inch.	15 inch.	6 inch.....	1.75	3.90	6.40
24 inch.	16 inch.	6 inch.....	1.80	4.00	6.50
24 inch.	17 inch.	6 inch.....	1.95	4.20	6.75
24 inch.	18 inch.	6 inch.....	2.10	4.30	7.00
24 inch.	20 inch.	6 inch.....	2.40	5.00	7.50
25½ inch.	15½ inch.	6 inch.....	1.75	3.60	6.50
25 inch.	17 inch.	6 inch.....	2.10	4.30	7.00
27 inch.	15 inch.	6 inch.....	2.00	4.25	7.25
28 inch.	17 inch.	6 inch.....	2.20	4.50	7.50
28 inch.	20 inch.	6 inch.....	2.70	5.50	8.00
30 inch.	12 inch.	6 inch.....	2.00	4.25	7.25
30 inch.	16 inch.	6 inch.....	2.25	4.75	7.75
30 inch.	18 inch.	6 inch.....	2.50	5.10	8.50
30 inch.	20 inch.	6 inch.....	3.00	6.25	9.00
32 inch.	18 inch.	6 inch.....	3.00	6.25	9.50
32 inch.	21 inch.	6 inch.....	3.40	7.20	9.75
34 inch.	20 inch.	6 inch.....	3.00	6.50	9.50
36 inch.	18 inch.	6 inch.....	3.00	6.50	9.50
36 inch.	20 inch.	6 inch.....	3.70	7.75	10.50
36 inch.	22 inch.	6 inch.....	3.70	7.75	10.50
38 inch.	20 inch.	6 inch.....	3.80	8.00	11.00
40 inch.	20 inch.	6 inch.....	4.00	8.75	11.75
41 inch.	22 inch.	6 inch.....	4.25	9.00	12.00
42 inch.	20 inch.	6 inch.....	4.25	9.00	12.00
42 inch.	22 inch.	6 inch.....	4.25	9.00	12.00
48 inch.	20 inch.	6 inch.....	5.30	11.50	13.25
48 inch.	23 inch.	6 inch.....	5.75	12.25	15.00
48 inch.	24 inch.	6 inch.....	5.75	12.25	15.00

CAST IRON FIXTURES—Continued.

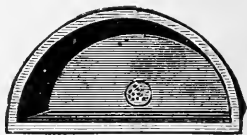
CORNER SINKS.



No.	Front.	Side.	Depth.	Plain.	Galvanized.	Enameled.
1	24 in.	17 in.	6 in.	1.25	2.75	6.00
2	29 "	20 "	6 "	1.75	3.50	7.00
3	31 "	22 "	6 "	2.10	4.20	8.00

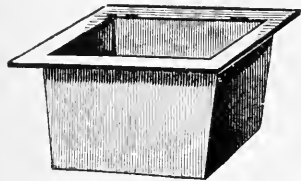
HALF ROUND SINKS.

Numbers.	Side.	Front.	Depth.	Plain.	Galvanized.	Enameled.
1	24 in.	14 in.	6 in.	1.50	3.25	6.00
2	27 "	14 "	6 "	1.80	3.90	7.00
3	28 "	16 "	6 "	2.00	4.00	7.75
4	29 "	15 "	6 "	2.00	4.00	7.75
5	31 "	17 "	6 "	2.25	4.75	9.00



To price of Plain Sinks add \$1.00 for Overflow.

SLOP SINKS.



Length.	Width.	Depth.	Plain.	Galvanized.	Enameled.
16 in.	16 in.	10 in.	2.70	5.25	7.50
20 "	14 "	12 "	3.50	6.50	8.50
20 "	16 "	12 "	4.00	8.25	10.00
24 "	20 "	12 "	5.00	9.50	11.50
30 "	20 "	12 "	8.00	15.00	16.00



Solid.

SINK LEGS.

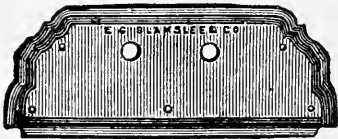


Extension.

Plain. Galvanized.

Price.....	.50	1.00
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SINK BACKS.



Size.....	14	16	18	20	22	23	24	25	27	28	30	32	34	36	38
Plain.....	1.05	1.10	1.20	1.25	1.35	1.40	1.50	1.55	1.70	1.80	2.00	2.25	2.50	2.75	3.00
Galvanized .....	1.75	1.90	2.10	2.25	2.50	2.70	2.80	2.90	3.25	3.50	4.00	4.25	4.75	5.00	5.50
Enameled .....	2.75	2.90	3.15	3.25	3.40	3.70	3.70	3.90	4.25	4.75	5.00	5.25	5.75	6.00	6.50

Add for Air Chambers.—Plain, \$2.00; Galvanized, \$2.50; Enameled, \$3.00.

SINK STRAINERS.

In 4, 4½, 4¾, 5 and 5½ Sizes.



	Plain.	Galvanized.	Enameled.
Price per dozen.....	1.50	2.60	3.00

PLUG SINK STRAINERS.

	Plain.	Galvanized.	Enameled.
Price per dozen .....	3.25	5.00	6.00



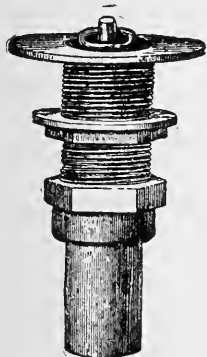
## PLUGS AND COUPLINGS.

FOR SOAP-STONE WASH TRAY.

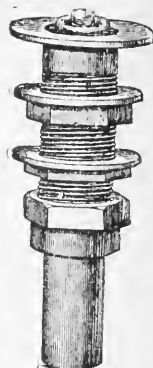
Size .....	in.	I	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Finished .....	per doz.	\$15.00	16.00	26.00	40.00
Nickel Plated .....	"	17.00	19.00	29.00	44.00
Silver Plated .....	"	21.00	23.00	33.00	48.00

FOR IRON WASH STAND.

Finished .....	per doz.	\$20.00
Nickel Plated .....	"	22.00
Silver Plated .....	"	28.00



For Soap-Stone  
Wash Tray.



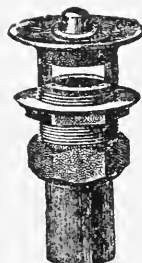
For Iron Wash  
Stand.

## BASIN PLUGS.



COMMON OVERFLOW.

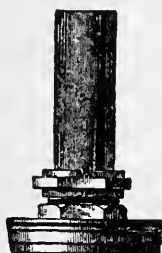
Finished .....	per doz.	\$8.00
Nickel Plated .....	"	8.50
Silver Plated .....	"	10.00



PATENT OVERFLOW.

Finished .....	per doz.	\$9.00
Nickel Plated .....	"	9.50
Silver Plated .....	"	11.00

## VENTILATING TRAP SCREWS.



STRAIGHT COUPLING.

Size, 4 x 1 $\frac{1}{2}$ .....per doz. \$23.00

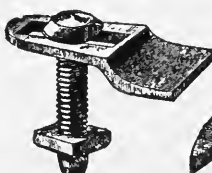


BENT COUPLING.

Size, 4 x 1 $\frac{1}{2}$ .....per doz. \$24.00

## BASIN CLAMPS.

No. 1.....	per doz.	\$1.25
No. 2.....	"	1.50



No. 1.



No. 2.



No. 3.



No. 4.

## BASIN JOINT.

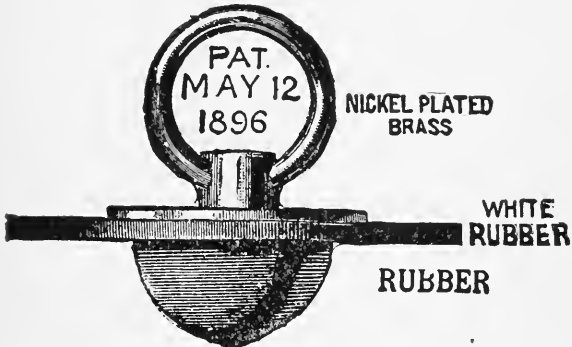
No. 3.....	per doz.	\$2.00
No. 4.....	"	8.00

MISCELLANEOUS.

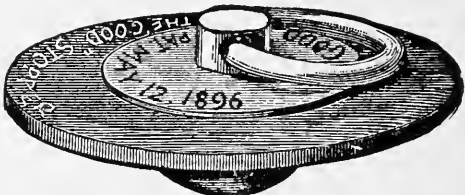
THE "GOOD" BATH AND BASIN STOPPERS.

The most convenient stopper made. There are only two sizes. These fit any basin, bath, laundry tub or wash tray, never allow a leak, even if outlet is not perfectly round. Overcome all objections to the common metal and rubber plug stoppers.

Bath Size, per dozen.....\$6.00  
Basin Size, " ..... 4.20

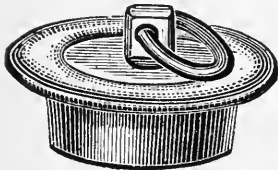


Basin Stopper.



Bath Stopper.

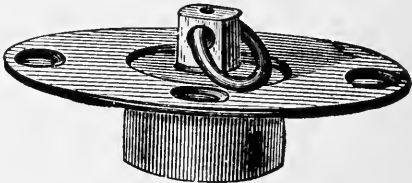
SINK, BATH OR WASH TRAY PLUGS.



Sink or Bath Plug.

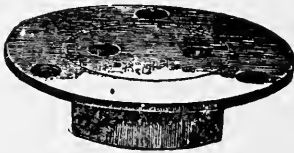
PRICES PER DOZEN.

Sizes .....	1	1 1/4	1 1/2	2
Sink or Bath Plugs....	\$2.50	3.00	4.00	7.00
" " " N. P. ....	3.50	4.50	5.50	10.00
Wash Tray Plugs.....	6.00	7.00	10.00	



Wash Tray Plug.

TRAP AND DECK SCREWS.



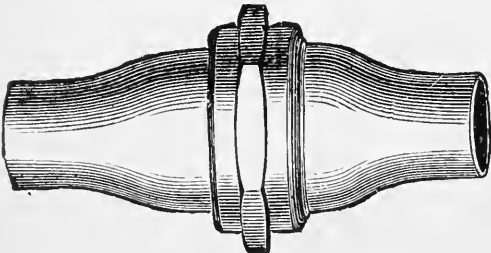
TRAP SCREWS.

Size, Inches.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6
Per Dozen.....	\$1.80	2.25	2.50	3.00	4.00	7.00	10.00	15.00	18.00	20.00	27.50	42.50

DECK SCREWS.

Size, Inches.....	1	1 1/4	1 1/2	2	2 1/2	3
Per Dozen.....	\$10.00	12.00	14.00	18.00	24.00	33.00

VALVE COUPLINGS.—GROUND FACE.



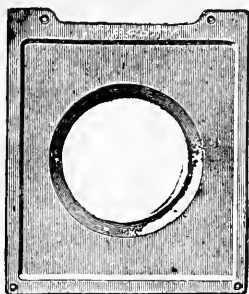
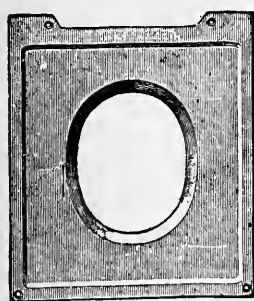
Sizes.	To Solder, per doz.	Screw'd for Iron Pipe.
1/2	\$10.00	\$11.00
5/8	12.00	-----
3/4	15.00	17.00
1	20.00	23.00
1 1/4	30.00	34.00
1 1/2	40.00	44.00
2	60.00	70.00

RING HANGER.

Per 100.

Size .....	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Plain Iron.....	\$5.00	5.00	5.80	6.75	7.50	10.00	14.00
Galvanized.....	6.50	6.50	7.00	8.00	9.00	12.00	16.00





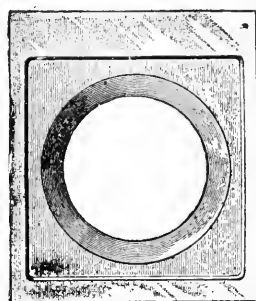
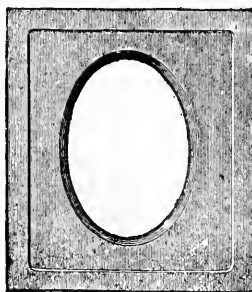
## PORCELAIN DRIP TRAYS.

Oval..... \$1.00  
Round..... 1.00

## ENAMELED IRON DRIP TRAYS.

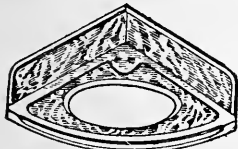
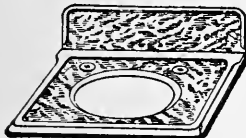
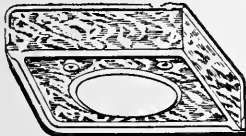
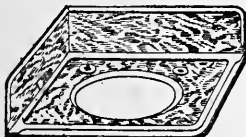
Both Sides Enameled.

Oval..... \$1.00  
Round..... 1.00



## MARBLE SLABS.

All Corner or Quarter Circle Slabs are swelled one inch on front edges to give room for basins.

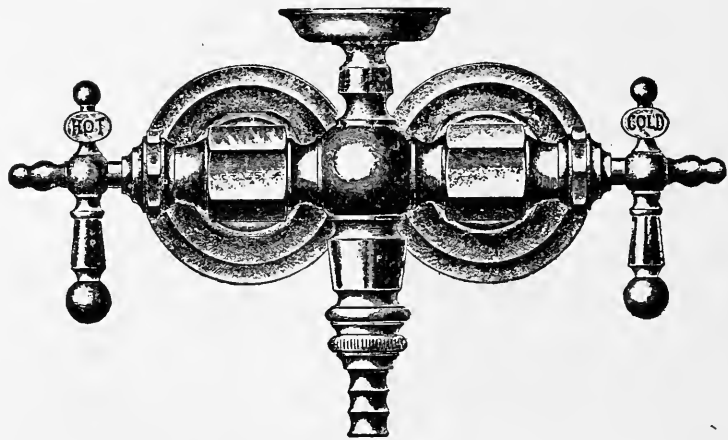
Style of Slab.	Size of Marble.	Height of Back.	Contents.	Height of Back.	Contents.
 <b>CORNER SLAB.</b>	18x18 inches.	8 inches.	4 ft. 11 in.	10 inches.	5 ft. 5 in.
	20x20 "	8 "	5 " 8 "	10 "	6 " 3 "
	22x22 "	8 "	6 " 7 "	10 "	7 " 2 "
	24x24 "	8 "	7 " 6 "	10 "	8 " 2 "
 <b>SINGLE BACK.</b>	20x24 "	8 "	5 " 5 "	10 "	5 " 10 "
	20x26 "	8 "	5 " 10 "	10 "	6 " 3 "
	20x28 "	8 "	6 " 3 "	10 "	6 " 8 "
	20x30 "	8 "	6 " 8 "	10 "	7 " 2 "
 <b>RIGHT HAND END.</b>	20x24 "	8 "	6 " 6 "	10 "	7 " 2 "
	20x26 "	8 "	6 " 11 "	10 "	7 " 7 "
	20x28 "	8 "	7 " 4 "	10 "	8 " 1 "
	20x30 "	8 "	7 " 9 "	10 "	8 " 6 "
 <b>LEFT HAND END.</b>	20x24 "	8 "	6 " 6 "	10 "	7 " 2 "
	20x26 "	8 "	6 " 11 "	10 "	7 " 7 "
	20x28 "	8 "	7 " 4 "	10 "	8 " 1 "
	20x30 "	8 "	7 " 9 "	10 "	8 " 6 "

In figuring, add one inch to each finished edge.

All the above Slabs are  $1\frac{1}{4}$  inch countersunk, with  $\frac{7}{8}$  backs, Italian Marble, drilled for 3 clamps, 2 cock holes, and a raised place for chain-stay hole, which is not drilled unless ordered. All edges O. G. mould. All cut for 14 inch Basin.

IMPROVED DOUBLE BATH COCK.—No. 4½.

WITH JEWEL CUP.

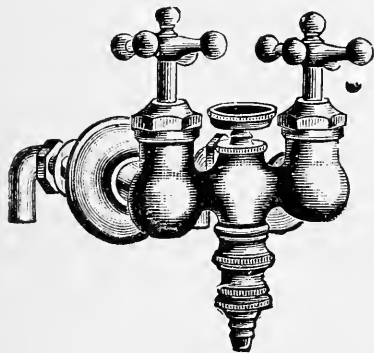


FULLER PATTERN.

Centre to Centre, 3½ inches.

Nickel Plated, each ..... 12.00

This Bath Cock is provided with Union Joints, by means of which the body of the Cock may be detached and the working parts repaired without removing the rear connections.



COMPRESSION DOUBLE BATH COCKS.—No. 1.

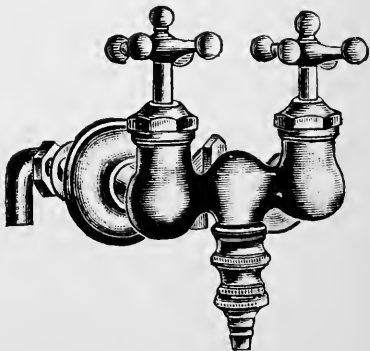
FOR HOT AND COLD WATER, WITH SPRINKLER AND RING CUP.

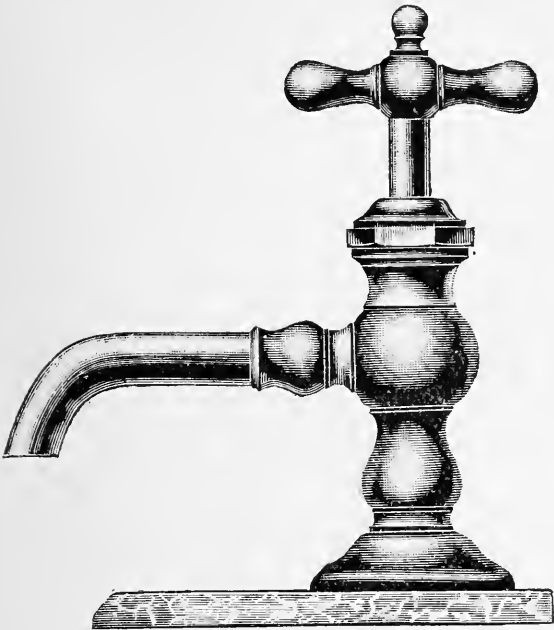
Nickel Plated..... Each, 8.00

DOUBLE COMPRESSION BATH COCKS.—No. 10.

3½ in. Centre to Centre.

Nickel Plated..... Each, \$5.50





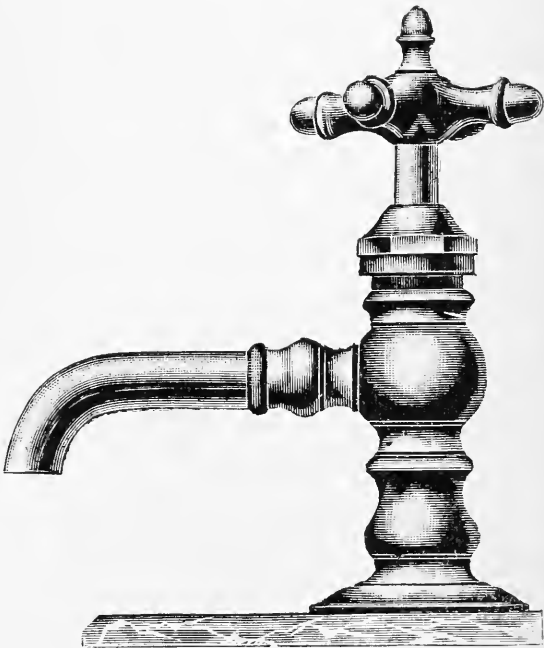
COMPRESSION BASIN  
COCK.—No. 1.

WITH T HANDLE.

Finished.....	Per Doz.	\$18.00
Nickel plated.....	"	19.00
Silver plated.....	"	35.00

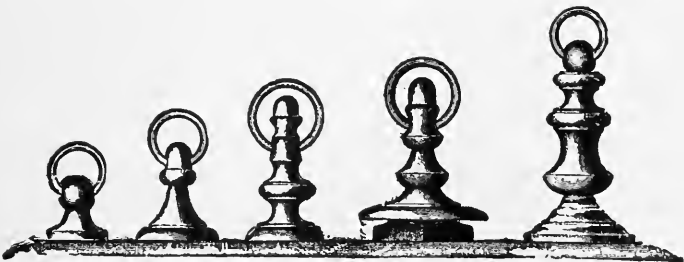
COMPRESSION BASIN  
COCK.—No. 2.

WITH FOUR-ARM HANDLE.



Finished.....	Per Doz.	\$20.00
Nickel plated.....	"	24.00
Silver plated.....	"	36.00

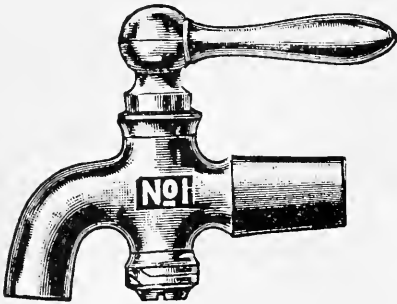
CHAIN STAYS.



Number.....	No. 0.	No. 1.	No. 2.	No. 3.	No. 4.			
Finished.....				0	I	2	3	4
Nickel plated.....				2.00	2.00	3.00	3.50	5.50
				2.50	2.50	3.75	4.25	6.50

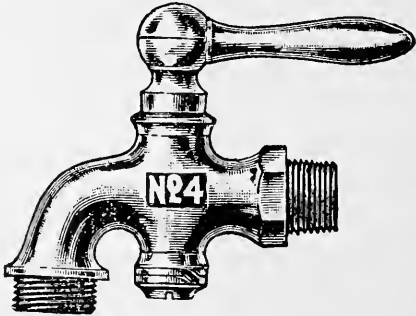
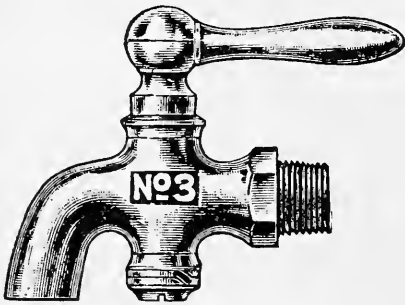


BALL-HANDLE FINISHED BIBBS.



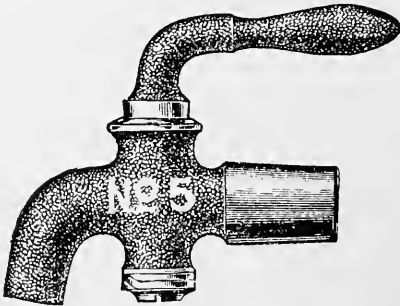
	¼-in.	⅜-in.	½-in.	⅝-in.	¾-in.	1-in.	1¼-in.	1½-in.	2-in.
No. 1. Plain Bibb, finished, per doz.....	\$13.00	\$15.00	\$17.00	\$20.00	\$26.00	\$39.00	\$64.00	\$90.00	\$180.00
No. 1. Plain Bibb, N. P., per doz.....	15.00	17.00	19.50	22.50	28.50	42.00	.....	.....	.....
No. 2. Hose Bibb, finished, per doz.....	.....	.....	19.00	22.00	28.00	42.00	.....	.....	.....
No. 2. Hose Bibb, N. P., per doz.....	.....	.....	21.50	24.50	30.50	45.00	.....	.....	.....

BALL-HANDLE FINISHED BIBBS FOR IRON PIPE.



	¼-in.	⅜-in.	½-in.	⅝-in.	¾-in.	1-in.
No. 3. Plain for I. P., finished, per doz....	\$15.00	\$17.00	\$19.00	\$22.00	\$28.00	\$42.00
“ “ “ N. P., “ .....	17.00	19.00	21.50	24.50	30.50	45.00
No. 4. Hose for I. P., finished, “ .....	.....	.....	21.00	24.00	30.00	45.00
“ “ “ N. P., “ .....	.....	.....	23.50	26.50	32.50	48.00

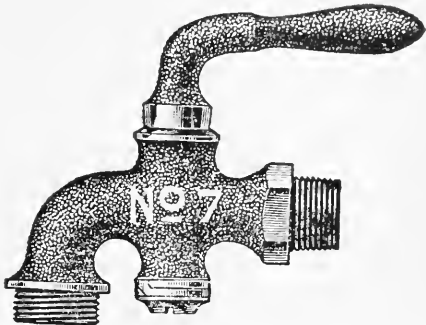
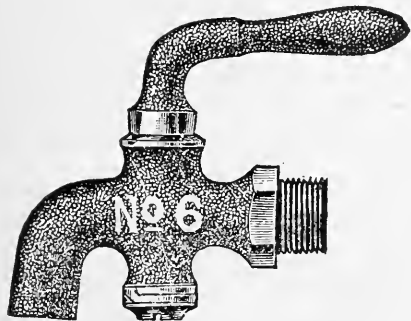
PLAIN BIBBS.



	¼-in.	⅜-in.	½-in.	⅝-in.	¾-in.	1-in.	1¼-in.	1½-in.	2-in.
No. 5. Rough, per doz.,	\$9.00	\$11.00	\$14.00	\$16.00	\$21.00	\$32.00	\$52.00	\$72.00	\$150.00
No. 5. Finished, “	10.00	12.00	15.00	18.00	24.00	36.00	60.00	84.00	170.00
No. 5. N. P., “	12.00	14.00	17.50	20.50	26.50	39.00	.....	.....	.....

No. 5 is same list as formerly, and is used as basis. For all other Bibbs of this kind, i. e., I. P. or Hose End, etc., see next page.

PLAIN BIBBS FOR IRON PIPE.

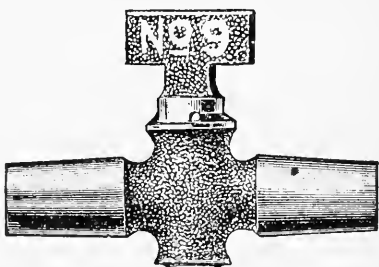
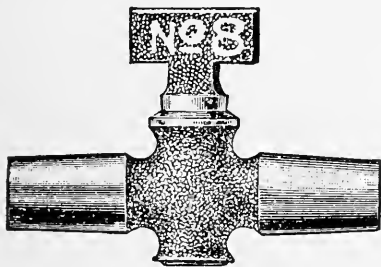


	¼-in.	⅜-in.	½-in.	⅝-in.	¾-in.	1-in.	1¼-in.	1½-in.	2-in.
No. 6. Rough, per doz..	\$11.00	\$13.00	\$16.00	\$18.00	\$23.00	\$35.00	\$56.00	\$78.00	\$160.00
No. 6. Finished, per doz.	12.00	14.00	17.00	20.00	26.00	39.00	64.00	90.00	180.00
No. 6. N. P., per doz...	14.00	16.00	19.50	22.50	28.50	42.00	.....	.....	.....
No. 7. Rough, per doz..	.....	.....	18.00	20.00	25.00	38.00	60.00	84.00	170.00
No. 7. Finished, per doz	.....	.....	19.00	22.00	28.00	42.00	68.00	96.00	190.00
No. 7. N. P., per doz...	.....	.....	21.50	24.50	30.50	45.00	.....	.....	.....

ROUGH STOP.

ROUGH STOP AND WASTE.

T-HANDLE RIVET BOTTOM.

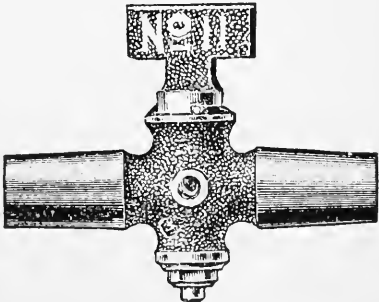
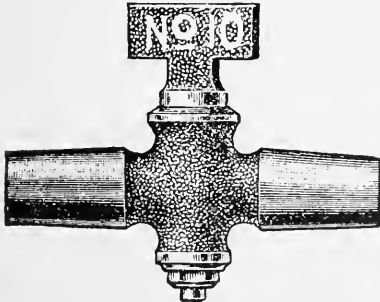


	⅜-in.	½-in.	⅝-in.	¾-in.	1-in.
No. 8. Rough Stop, per doz.....	\$10.50	\$12.50	\$14.50	\$18.50	\$27.00
No. 9. " " and Waste, per doz.....	12.50	14.50	16.50	20.50	30.00

ROUGH STOP.

ROUGH STOP AND WASTE.

T-HANDLE, NUT AND WASHER.

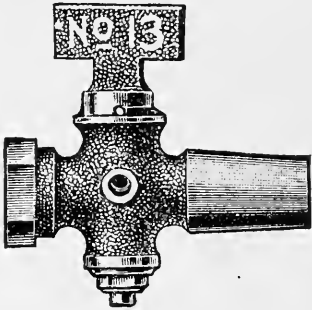
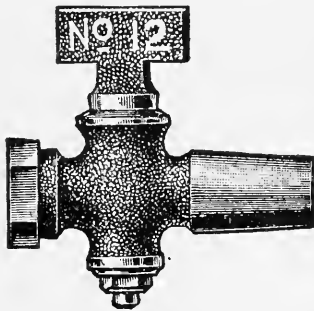


	⅜-in.	½-in.	⅝-in.	¾-in.	1-in.	1¼-in.	1½-in.	2-in.
No. 10. Rough Stop, per doz...	\$11.00	\$13.00	\$15.00	\$19.00	\$28.00	\$46.00	\$64.00	\$110.00
No. 11. " " and Waste, per doz.....	13.00	15.00	17.00	21.00	31.00	50.00	70.00	120.00

**Rough Stop.**

**Rough Stop and Waste.**

(T-HANDLE, NUT AND WASHER FOR LEAD AND IRON PIPE)

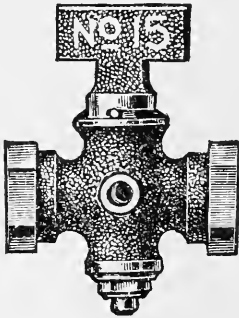
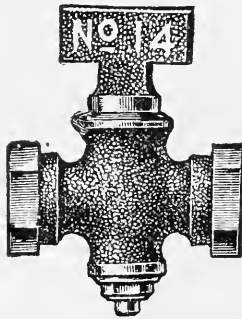


	3/8-in.	1/2-in.	5/8-in.	3/4-in.	1-in.	1 1/4-in.	1 1/2-in.	2-in.
No. 12. Rough, per doz .....	\$12.00	\$14.00	\$16.50	\$20.50	\$30.00	\$48.50	\$67.50	\$115.00
No. 13. " Stop and Waste, per doz .....	14.00	16.00	18.50	22.50	33.00	52.50	73.50	125.00

**Rough Stop.**

**Rough Stop and Waste.**

(T-HANDLE, NUT AND WASHER FOR IRON PIPE)

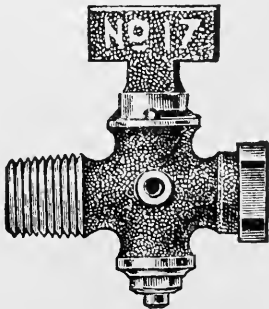
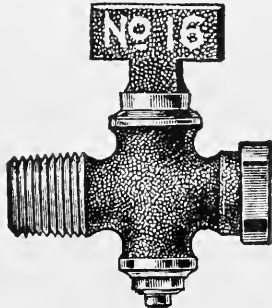


	3/8-in.	1/2-in.	5/8-in.	3/4-in.	1-in.	1 1/4-in.	1 1/2-in.	2-in.
No. 14. Rough Stop, per doz..	\$13.00	\$15.00	\$18.00	\$22.00	\$32.00	\$51.00	\$71.00	\$120.00
No. 15. Stop and Waste, per doz.	15.00	17.00	20.00	24.00	35.00	55.00	77.00	130.00

**Rough Stop.**

**Rough Stop and Waste.**

(T-HANDLE, NUT AND WASHER FOR IRON PIPE)

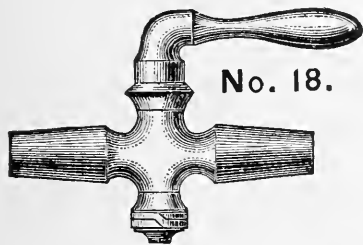


	3/8-in.	1/2-in.	5/8-in.	3/4-in.	1-in.	1 1/4-in.	1 1/2-in.	2-in.
No. 16. Rough Stop, per doz...	\$13.00	\$15.00	\$18.00	\$22.00	\$32.00	\$51.00	\$71.00	\$120.00
No. 17. " " and Waste, per doz.....	15.00	17.00	20.00	24.00	35.00	55.00	77.00	130.00

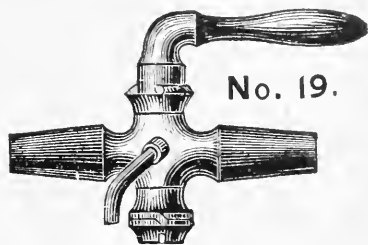
Lever Handle Stop.

Lever Handle Stop and Waste.

(FOR LEAD PIPE.)



No. 18.



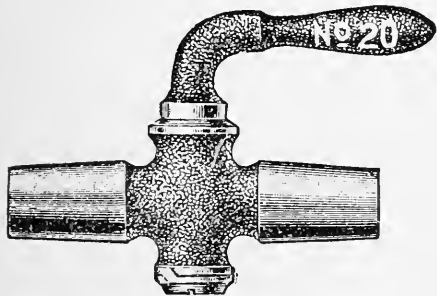
No. 19.

	¼-in.	⅜-in.	½-in.	⅝-in.	¾-in.	1-in.	1¼-in.	1½-in.	2-in.
No. 18. Lever Handle, finished, per doz.....	\$18.50	\$19.50	\$22.00	\$28.50	\$42.00	\$68.50	\$95.50	\$190.00	
No. 18. N. P., per doz.....	20.50	22.00	24.50	31.00	45.00	.....	.....	.....	.....
No. 19. Lever Handle, finished, Stop and Waste, per doz.....	20.50	21.50	24.00	30.50	45.00	.....	.....	.....	.....
No. 19. Lever Handle, N. P. Stop and Waste, per doz.....	22.50	24.00	26.50	33.00	48.00	.....	.....	.....	.....

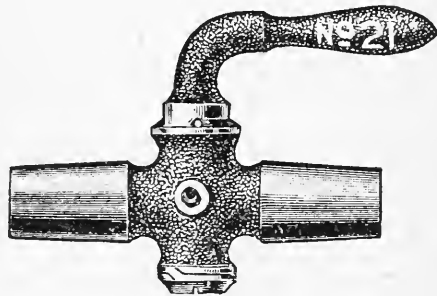
Lever Handle Stop.

Lever Handle Stop and Waste.

Spring Bottom. (FOR LEAD PIPE.) Spring Bottom.



No. 20



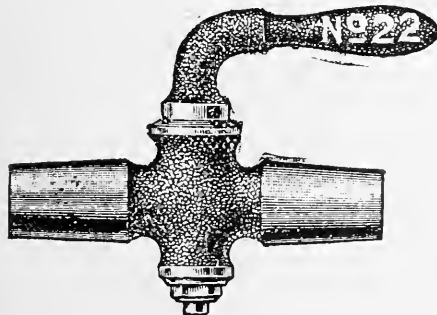
No. 21

	⅜-in.	½-in.	⅝-in.	¾-in.	1-in.	1¼-in.	1½ in.	2-in.
No. 20. Lever Handle Stops, rough, per doz.....	\$12.00	\$14.00	\$16.50	\$20.50	\$30.00	\$48.50	\$67.50	\$115.00
No. 20. Lever Handle Stops, finished, per doz.....	15.50	17.50	20.00	26.50	39.00	64.50	89.50	180.00
No. 21. Lever Handle Stop and Waste, rough, per doz.....	14.00	16.00	18.50	22.50	33.00	52.50	73.50	125.00
No. 21. Lever Handle Stop and Waste, finished, per doz....	18.00	20.00	22.50	29.00	43.00	.....	.....	.....

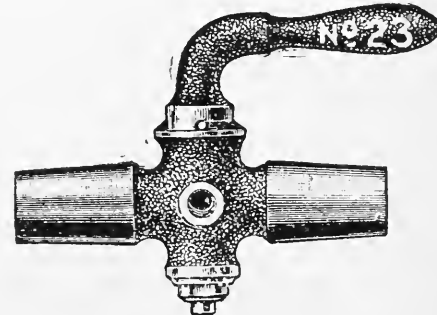
Lever Handle Stop.

Lever Handle Stop and Waste.

N. & W. (FOR LEAD PIPE.) N. & W.



No. 22



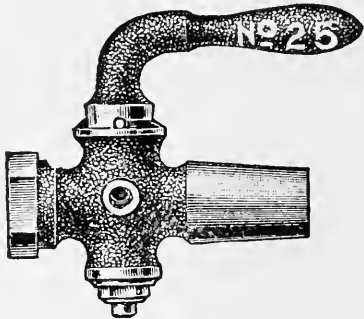
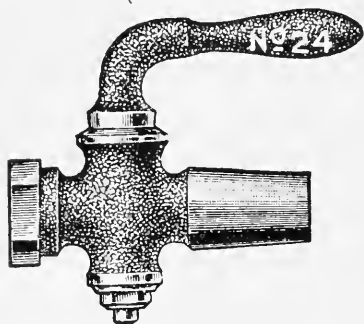
No. 23

	⅜-in.	½-in.	⅝-in.	¾-in.	1-in.	1¼-in.	1½-in.	2 in.
No. 22. Lever Handle Stops, rough, per doz.....	\$12.00	\$14.00	\$16.50	\$20.50	\$30.00	\$48.50	\$67.50	\$115.00
No. 22. Lever Handle Stops, finished, per doz.....	15.50	17.50	20.00	26.50	39.00	64.50	89.50	180.00
No. 23. Lever Handle Stop and Waste, rough, per doz ....	14.00	16.00	18.50	22.50	33.00	52.50	73.50	125.00
No. 23. Lever Handle Stop and Waste, finished, per doz....	18.00	20.00	22.50	29.00	43.00	.....	.....	.....

Lever Handle Stop.

Lever Handle Stop and Waste.

(NUT AND WASHER FOR LEAD AND IRON PIPE)

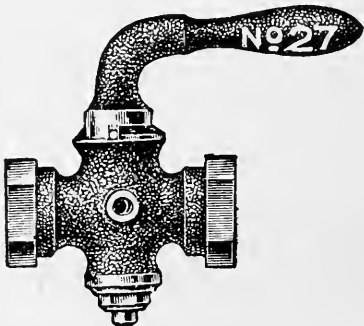
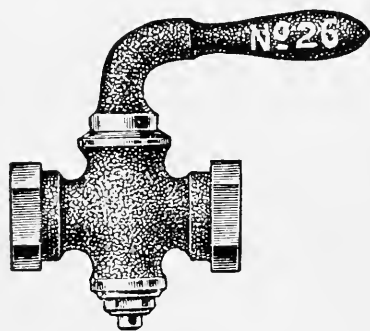


	3⁄8-in.	1⁄2-in.	5⁄8-in.	3⁄4-in.	1-in.	1 1⁄4-in.	1 1⁄2-in.	2-in.
No. 24. Rough, per doz.....	\$13.00	\$15.00	\$18.00	\$22.00	\$32.00	\$51.00	\$71.00	\$120.00
No. 25. Stop and Waste, per doz..	15.00	17.00	20.00	24.00	35.00	55.00	77.00	130.00

Lever Handle Stop.

Lever Handle Stop and Waste.

(N. AND W. FOR IRON PIPE)



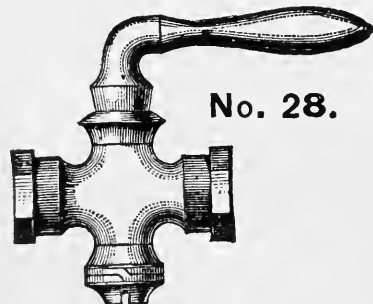
	3⁄8-in.	1⁄2-in.	5⁄8-in.	3⁄4-in.	1-in.	1 1⁄4-in.	1 1⁄2-in.	2-in.
No. 26. Rough, Stop, per doz.....	\$14.00	\$16.00	\$19.50	\$23.50	\$34.00	\$53.50	\$74.50	\$125 00
No. 26. Finished, per doz .....	17.50	19.50	23.00	29 50	43.00	.....	.....	.....
No. 27. Rough, Stop and Waste, per doz.	16.00	18.00	21.50	25.50	37.00	57 50	80 50	135.00
No. 27. Finished, per doz.....	19.50	21 50	25.00	31.50	46.00	.....	.....	.....

Lever Handle, Finished Stops, or Stop and Wastes with Spring Bottom, same price as Nut and Washer.

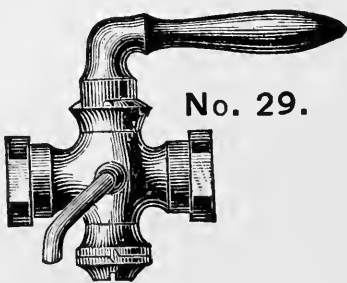
Lever Handle Stop.

Lever Handle Stop and Waste.

(SPRING BOTTOM FOR I. P.)



No. 28.



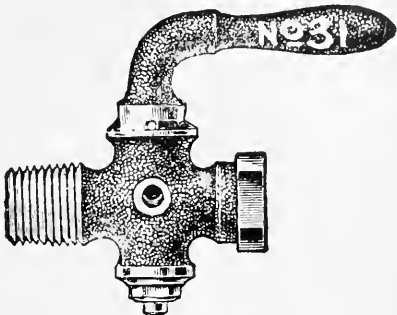
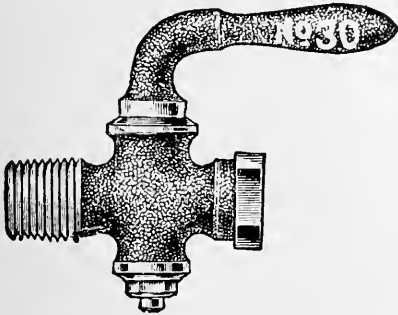
No. 29.

	3⁄8-in.	1⁄2-in.	5⁄8-in.	3⁄4-in.	1-in.
No. 28. Finished, per doz.....	\$20.50	\$21 50	\$25.00	\$31.50	\$46.00
No. 28. N. P., per doz ..	22.50	24.00	27.50	34.00	49.00
No. 29. Finished, per doz.....	22.50	23.50	27.00	33.50	49.00
No. 29. N. P.. " .....	24.50	26.00	29.50	36.00	52 00

**Lever Handle Stop.**

**Lever Handle Stop and Waste.**

(N. AND W. MALE AND FEMALE I. P.)



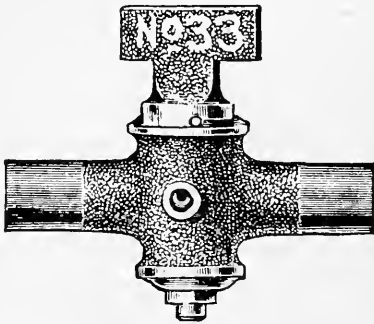
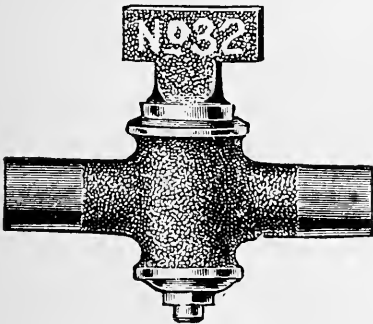
	$\frac{3}{8}$ -in.	$\frac{1}{2}$ -in.	$\frac{5}{8}$ -in.	$\frac{3}{4}$ -in.	1-in.	1 $\frac{1}{4}$ -in.	1 $\frac{1}{2}$ -in.	2-in.
No. 30. Rough, per doz...	\$14.00	\$16.00	\$19.50	\$23.50	\$34.00	\$53.50	\$74.50	\$125.00
No. 31. Rough, per doz...	16.00	18.00	21.50	25.50	37.00	57.50	80.50	135.00

Above with Spring Bottom, same list as Nut and Washer.

**Round-Way Stop.**

**Round-Way Stop and Waste.**

(FOR LEAD PIPE.)

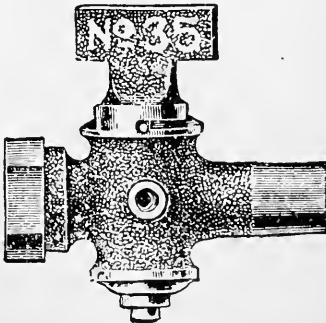
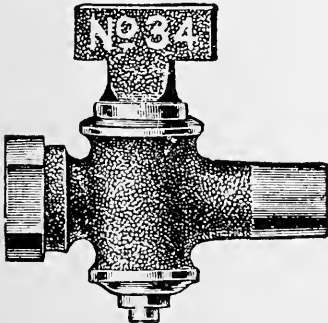


	$\frac{1}{2}$ -in.	$\frac{3}{8}$ -in.	$\frac{3}{4}$ -in.	1-in.	1 $\frac{1}{4}$ -in.	1 $\frac{1}{2}$ -in.	2-in.
No. 32. Rough Stop, per doz....	\$17.00	\$20.00	\$25.00	\$44.00	\$70.00	\$100.00	\$180.00
No. 33. Rough Stop and Waste, per doz.....	19.00	22.00	27.00	47.00	74.00	106.00	190.00

**Round-Way Stop.**

**Round-Way Stop and Waste.**

(FOR LEAD AND IRON.)

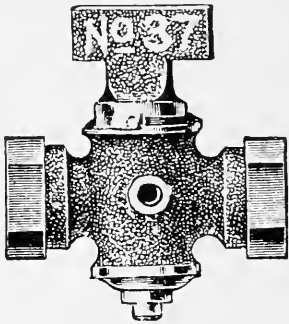
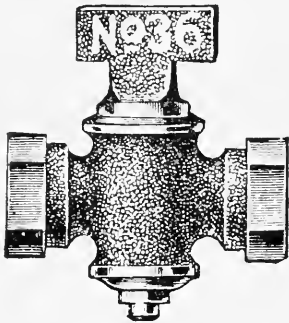


	$\frac{1}{2}$ -in.	$\frac{3}{8}$ -in.	$\frac{3}{4}$ -in.	1-in.	1 $\frac{1}{4}$ -in.	1 $\frac{1}{2}$ -in.	2-in.
No. 34. Rough Stop, per doz....	\$18.00	\$21.50	\$26.50	\$46.00	\$72.50	\$103.50	\$185.00
No. 35. Rough Stop and Waste, per doz.....	20.00	23.50	28.50	40.00	76.50	109.50	195.00

Round-Way Stop.

Round-Way Stop and Waste.

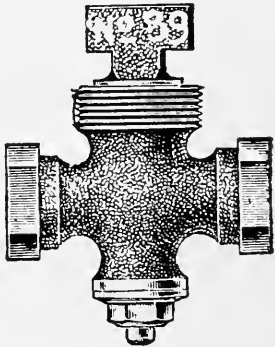
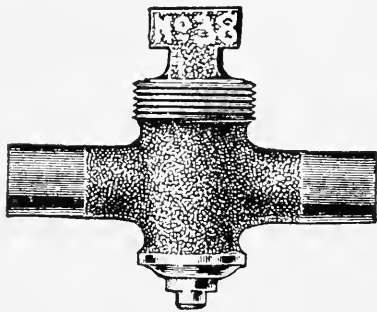
(FOR IRON PIPE.)



		1/2-in.	5/8-in.	3/4-in.	1-in.	1 1/4-in.	1 1/2-in.	2-in.
No. 36.	Rough Stop, per doz.....	\$19.00	\$23.00	\$28.00	\$48.00	\$75.00	\$107.00	\$190.00
No. 37.	" " and Waste, per doz.	21.00	25.00	30.00	51.00	79.00	113.00	200.00

Round-Way Stops "Minneapolis Pattern."

(NUT AND WASHER BOTTOM, ROUND WAY)

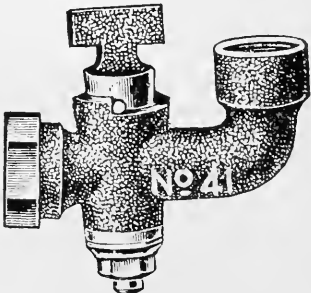
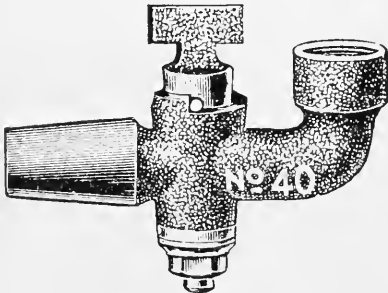


		1/2-in.	5/8-in.	3/4-in.	1-in.
No. 38.	For Lead Pipe, per doz. ....	\$21.00	\$26.00	\$29.50	\$50.00
No. 38.	" " and Iron Pipe, per doz.....	22.00	27.50	31.00	52.00
No. 39.	" Iron Pipe, per doz .....	23.00	29.00	32.50	54.00

For Iron Pipe, Male and Female End, same price as No. 39.

Hydrant Cocks.

(NUT AND WASHER, STRAIGHT WAY)



		1/2-in.	5/8-in.	3/4-in.	1-in.	1 1/4-in.
No. 40.	For Lead and Iron Pipe, rough, per doz.....	\$20.00	\$23.50	\$28.00	\$39.50	\$61.50
No. 41.	For Iron Pipe, rough, per doz.....	21.00	25.00	29.50	41.50	64.00
	Both Ends Lead Pipe, rough, per doz .....	19.00	22.00	26.50	37.50	59.00

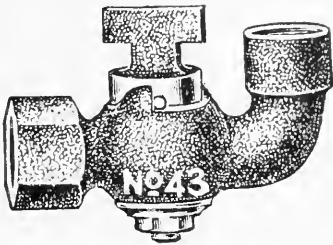
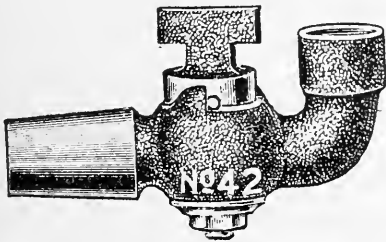
Rivet Bottom Hydrant Cocks.

		1/2-in.	5/8-in.	3/4-in.	1-in.
Rivet Bottom,	Both Ends Lead Pipe, per doz.....	\$18.50	\$21.50	\$26.00	\$36.50
" "	" " Iron " .....	20.50	24.50	29.00	40.50
" "	Lead and Iron Pipe, " .....	19.50	23.00	27.50	38.50



ROUND-WAY HYDRANT COCKS.

(NUT AND WASHER)

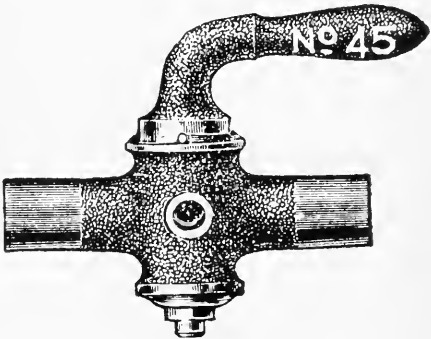
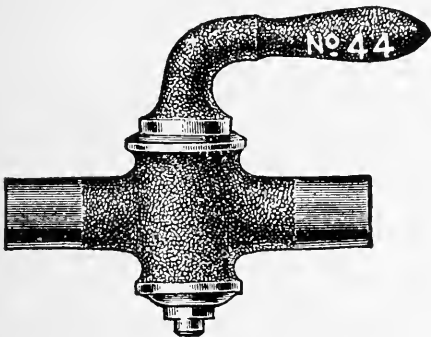


		1/2-in.	5/8-in.	3/4-in.	1-in.	1 1/4-in.
No. 42.	For Lead and Iron, per doz.....	\$24.00	\$28.50	\$34.00	\$55.50	\$85.50
No. 43.	For Iron Pipe, per doz.....	25.00	30.00	35.50	57.50	88.00
	Both Ends Lead Pipe, per doz.....	23.00	27.00	32.50	53.50	83.00

Round-Way Stop.

Round-Way Stop and Waste.

(LEVER HANDLE)

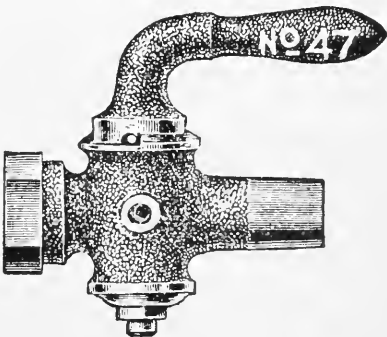
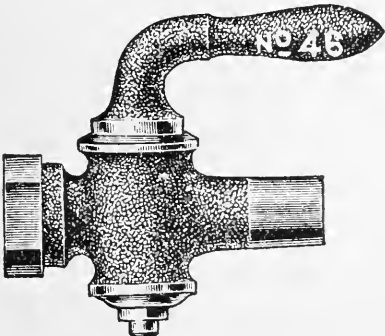


		1/2-in.	5/8-in.	3/4-in.	1-in.	1 1/4-in.	1 1/2-in.	2-in.
No. 44.	Rough Stop, per doz.....	\$18.00	\$21.50	\$26.50	\$46.00	\$72.50	\$103.50	\$185.00
No. 45.	" " and Waste, per doz.	20.00	23.50	28.50	49.00	76.50	109.50	195.00

Round-Way Stop.

Round-Way Stop and Waste.

(LEVER HANDLE)

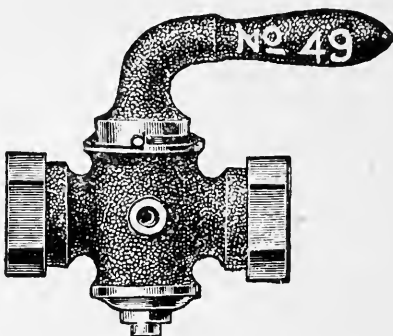
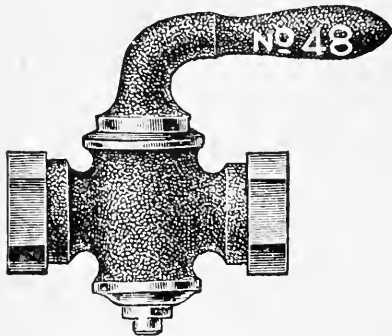


		1/2-in.	5/8-in.	3/4-in.	1-in.	1 1/4-in.	1 1/2 in.	2-in.
No. 46.	Rough Stop, Lead and Iron, per doz.....	\$19.00	\$23.00	\$28.00	\$48.00	\$75.00	\$107.00	\$190.00
No. 47.	Rough Stop and Waste, Lead and Iron, per doz...	21.00	25.00	30.00	51.00	79.00	113.00	200.00

Round=Way Stop.

Round=Way Stop and Waste.

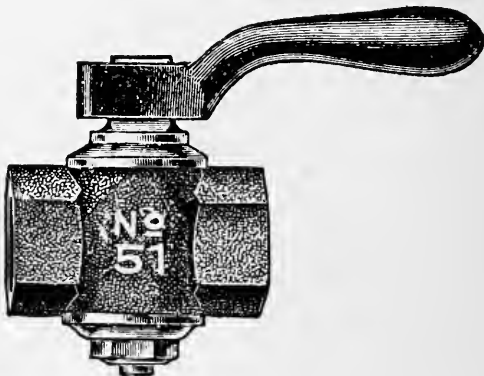
LEVER HANDLE.



	$\frac{1}{2}$	$\frac{3}{8}$ -in.	$\frac{1}{4}$ -in.	1-in.	1 $\frac{1}{4}$ -in.	1 $\frac{1}{2}$ -in.	2-in.
No. 48. Rough Stop, Iron Pipe, per doz .....	\$20.00	\$24.50	\$29.50	\$50.00	\$77.50	\$110.50	\$195.00
No. 49. Rough Stop and Waste, Iron Pipe, per doz .....	22.00	26.50	31.50	53.00	81.50	116.50	205.00

Round=Way Stop.

("H" PATTERN)



	$\frac{1}{2}$ -in.	$\frac{3}{8}$ -in.	$\frac{1}{4}$ -in.	1-in.
No. 50. Rough Stop, per doz .....	\$12.00	\$17.00	\$18.00	\$30.00
No. 50. " " and Waste, per doz .....	14.00	19.00	20.00	33.00
No. 51. " " L. H. per doz .....	13.00	18.50	19.50	32.00
No. 51. " " and Waste, L. H. per doz .....	15.00	20.50	21.50	35.00

Corporation Stops to drive into Main.

	$\frac{1}{2}$ -in.	$\frac{3}{8}$ -in.	$\frac{1}{4}$ -in.	1-in.	1 $\frac{1}{4}$ -in.
No. 52. For Iron Pipe, per doz .....	\$21.00	\$25.00	\$35.00	\$56.00	\$110.00
No. 53. " " with Eel Guard, per doz.	23.00	27.00	37.00	60.00	115.00

Corporation Stops.

(For Mueller Tapping Machine.)

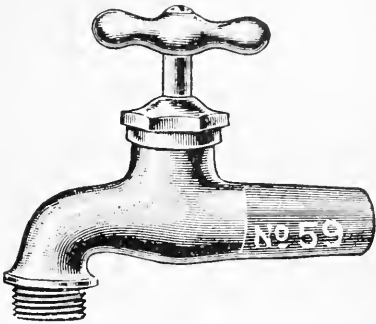
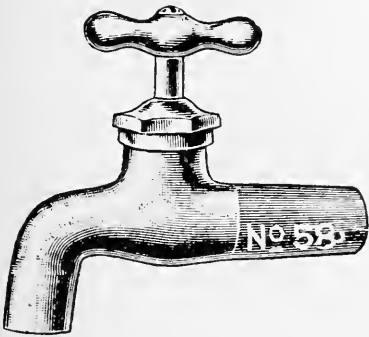
	$\frac{1}{2}$ -in.	$\frac{3}{8}$ -in.	$\frac{1}{4}$ -in.	1-in.
No. 54. Male for Iron Pipe, per doz .....	\$13.20	\$16.80	\$25.20	\$40.20
No. 55. With Straight or Bent Couplings, per doz .....	16.20	20.40	30.00	46.20

Corporation Stops.

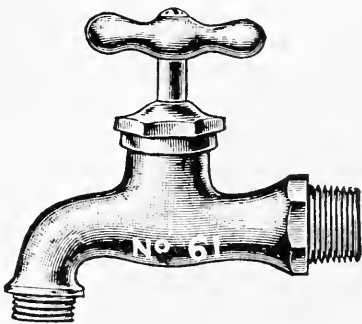
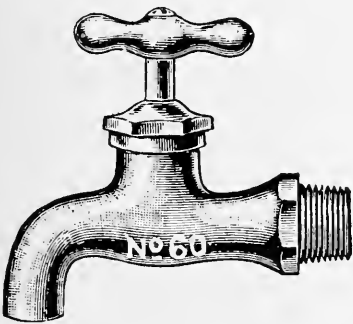
(For Payne Tapping Machine.)

	$\frac{1}{2}$ -in.	$\frac{3}{8}$ -in.	$\frac{1}{4}$ -in.	1-in.
No. 56. Male for Iron Pipe, per doz .....	\$16.00	\$20.00	\$29.00	\$46.00
No. 57. With Straight or Bent Couplings, per doz .....	19.00	23.00	34.00	53.00

COMPRESSION BIBBS.

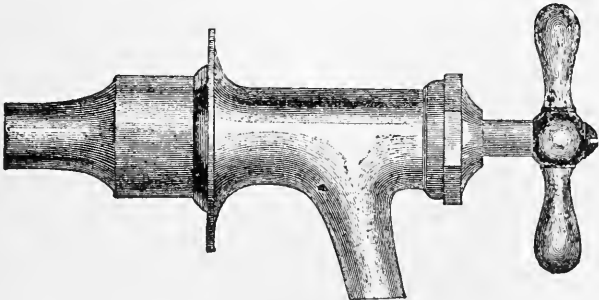


	$\frac{3}{8}$ -in.	$\frac{1}{2}$ -in.	$\frac{5}{8}$ -in.	$\frac{3}{4}$ -in.	1-in.	1 $\frac{1}{4}$ -in.	1 $\frac{1}{2}$ -in.	2-in.
No. 58. Finished, per doz.....	\$10.00	\$11.00	\$13.00	\$18.00	\$34.00	\$52.00	\$80.00	\$160.00
No. 58. N. P., " .....	12.00	13.00	15.00	20.50	37.00	.....	.....	.....
No. 58. Rough, " .....	9.50	10.50	12.00	17.00	30.00	44.00	68.00	140.00
No. 59. Finished, " .....	12.00	13.00	15.00	20.00	37.00	56.00	86.00	170.00
No. 59. N. P., " .....	14.00	15.50	17.50	22.50	40.00	.....	.....	.....
No. 59. Rough, " .....	11.50	12.50	14.00	19.00	33.00	48.00	74.00	150.00



	$\frac{3}{8}$ -in.	$\frac{1}{2}$ -in.	$\frac{5}{8}$ -in.	$\frac{3}{4}$ -in.	1-in.	1 $\frac{1}{4}$ -in.	1 $\frac{1}{2}$ -in.	2-in.
No. 60. Finished, per doz.....	\$12.00	\$13.00	\$15.00	\$20.00	\$37.00	\$56.00	\$86.00	\$170.00
No. 60. N. P., " .....	14.00	15.50	17.50	22.50	40.00	.....	.....	.....
No. 60. Rough, " .....	11.50	12.50	14.00	19.00	33.00	48.00	74.00	150.00
No. 61. Finished, " .....	14.00	15.00	17.00	22.00	40.00	60.00	92.00	180.00
No. 61. N. P., " .....	16.00	17.50	19.50	24.50	43.00	.....	.....	.....
No. 61. Rough, " .....	13.50	14.50	16.00	21.00	36.00	52.00	80.00	160.00

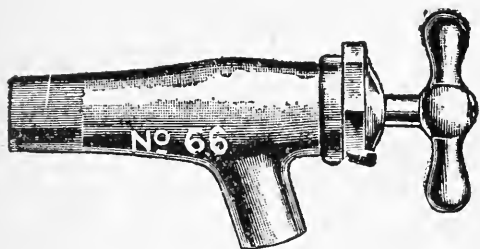
Compression Wash Tray Bibb, Flange and Thimble.



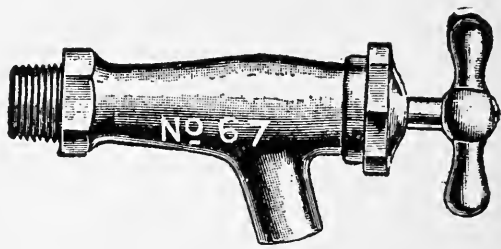
No. 65.

	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
No. 65. Finished, per doz.....	\$17.00	\$19.00	\$22.00	\$30.00	\$53.00
No. 65. N. P., per doz.....	20.00	22.50	25.50	34.00	57.00

COMPRESSION WASH TRAY BIBBS.



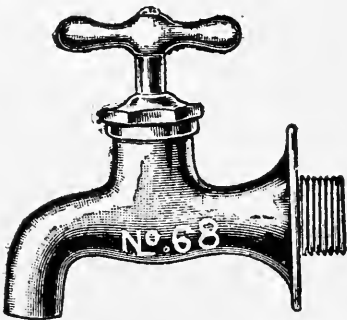
FOR LEAD PIPE.



FOR IRON PIPE.

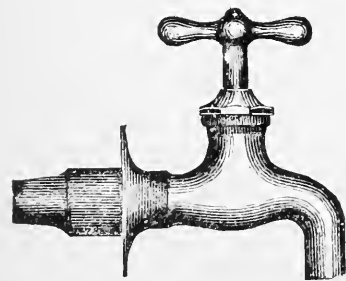
			1/2-in.	5/8-in.	3/4-in.				1/2-in.	5/8-in.	3/4-in.
No. 66.	Fin., per doz.		\$12.00	14.00	19.00	No. 67.	Fin., per doz.		\$14.00	16.00	21.00
No. 66.	N. P., " "	--	14.50	16.50	21.50	No. 67.	N. P., " "	--	16.50	18.50	23.50

COMPRESSION BIBBS WITH FLANGE FOR IRON PIPE.

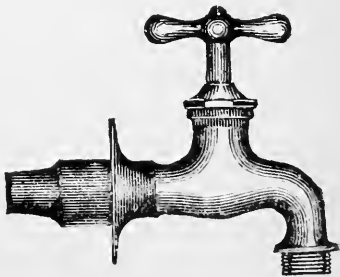


		1/2-in.	5/8-in.	3/4-in.	1-in.
Finished, per doz.	-----	\$16.00	17.50	25.00	46.00
N. P., per doz.	-----	18.50	20.00	27.50	49.00
Add for Hose End	-----	2.00	2.00	2.00	3.00

COMPRESSION WASH TRAY BIBBS, FLANGE AND THIMBLE.



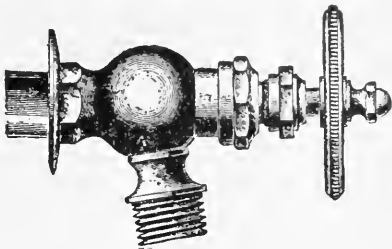
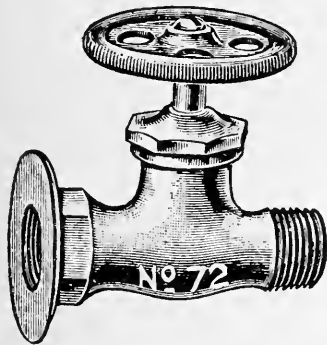
PLAIN BIBB.



HOSE BIBB.

		Sizes	3/8	1/2	5/8	3/4	1
Plain Bibb, Finished, per doz.	-----		\$16.00	18.00	21.00	28.00	51.00
" " N. P., " "	-----		19.00	21.50	24.50	32.00	55.00
Hose Bibb, Finished, per doz.	-----		18.00	20.00	23.00	30.00	54.00
" " N. P., " "	-----		21.00	23.50	26.50	34.00	58.00

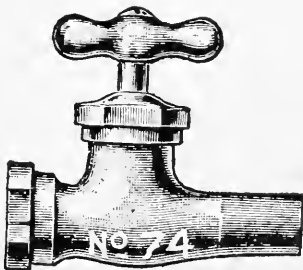
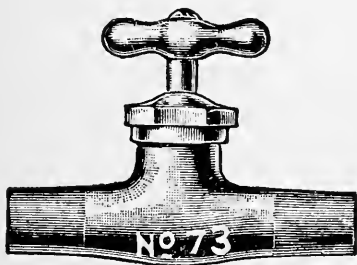
COMPRESSION SILL COCK.



No. 72A.

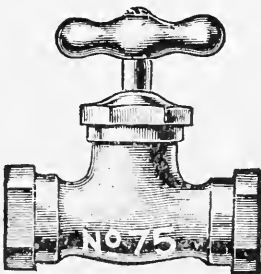
		1/2 in.	3/4 in.
No. 72.	Finished, per doz.....	\$22.00	\$24.00
No. 72.	N. P., per doz.....	25.00	27.00
No. 72A.	Finished, per doz.....	25.00	30.00
No. 72A.	N. P., per doz.....	29.00	34.00

COMPRESSION STOPS.



		3/8-in.	1/2-in.	5/8-in.	3/4-in.	1-in.	1 1/4-in.	1 1/2-in.
No. 73.	For Lead Pipe, finished, per doz .....	\$11.00	\$12.00	\$14.00	\$22.00	\$36.00	\$56.00	\$96.00
No. 73.	" " N. P., " .....	13.00	14.50	16.50	24.50	39.00	.....	.....
No. 73.	" " rough, " .....	10.50	11.50	13.00	21.00	32.00	48.00	84.00
No. 74.	" and Iron Pipe, finished, per doz. 12 00	13.00	15.00	17.50	23.00	38.00	.....	.....
No. 74.	" " " N. P., " 14 00	15.50	17.50	25.50	41.00	.....	.....	.....
No. 74.	" " " rough, " 11.50	12.50	14.00	22.00	34.00	.....	.....	.....

COMPRESSION STOP FOR IRON PIPE.

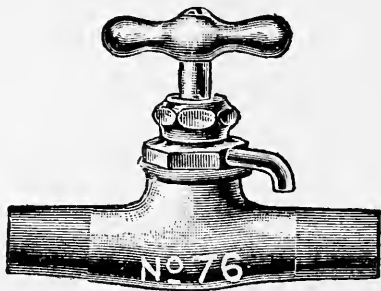


	3/8-in.	1/2-in.	5/8 in.	3/4-in.	1-in.	1 1/4-in.	1 1/2-in.
Finished, per doz .....	\$13.00	\$14.00	\$16.00	\$24.00	\$40.00	\$60.00	\$102.00
N. P., per doz. ....	15.00	16.50	18.50	26.50	43.00	.....	.....
Rough, per doz .....	12.50	13.50	15.00	23.00	36.00	52.00	90.00

NOTE —Add for Stuffing Box to regular list, as formerly, viz: 3/8-in., \$2.00; 1/2-in., \$2.00; 5/8-in., \$2.00; 3/4-in., \$3.00; 1 in., \$4.00.

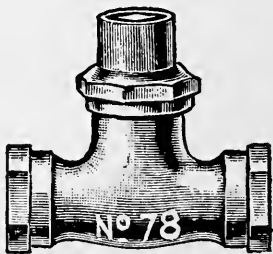
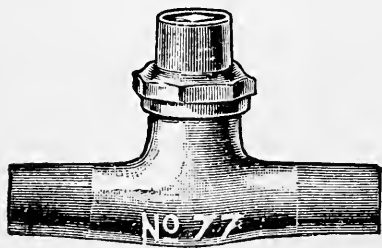
COMPRESSION STOP AND WASTE.

(WITH STUFFING BOX.)



	½-in.	⅝-in.	¾-in.	1-in.
Rough for Lead Pipe, per doz.....	\$15.00	\$18.00	\$25.50	\$42.00
Finished “ “ “ .....	16.50	19.50	27.00	44.00
N. P., “ “ “ .....	19.00	22.00	29.50	47.00
Add for (1) one Iron Pipe End .....	1.00	1.00	1.00	2.00
“ (2) two “ “ Ends.....	2.00	2.00	2.00	4.00

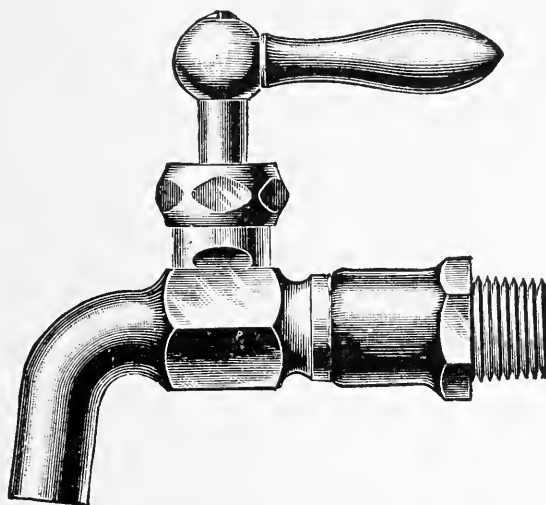
COMPRESSION STOPS WITH LOOSE KEY.



	½-in.	⅝-in.	¾-in.	1-in.
No. 77. For Lead Pipe, finished, per doz.....	\$18.00	\$20.00	\$28.00	\$44.00
No. 77. “ “ N. P., “ .....	20.50	22.50	30.50	47.00
No. 77. “ “ Rough, “ .....	17.00	19.00	29.00	40.00
No. 78. For Iron Pipe, finished, “ .....	20.00	22.00	31.00	48.00
No. 78. “ “ N. P. “ .....	22.50	24.50	33.50	51.00
No. 78. “ “ Rough, “ .....	19.00	21.00	30.00	46.00

Above prices include three Handles to the dozen Stops.

## FULLER BIBBS.

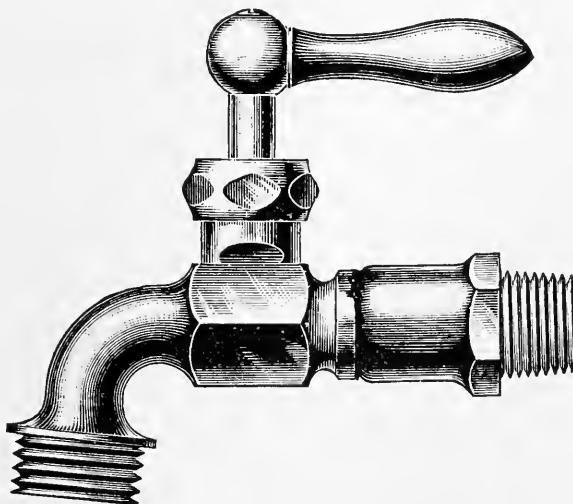


### FULLER PLAIN BIBBS FOR IRON PIPE.

Size, inches.....	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Finished, per doz.....	\$21.00	24.00	30.00	40.00
Nickel Plated, per doz.....	25.00	28.00	36.00	50.00

### FULLER PLAIN BIBBS FOR LEAD PIPE.

Size, inches.....	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Finished, per doz.....	\$18.00	20.00	26.00	36.00
Nickel Plated, per doz.....	22.00	24.00	32.00	46.00



### FULLER HOSE BIBBS, IRON PIPE.

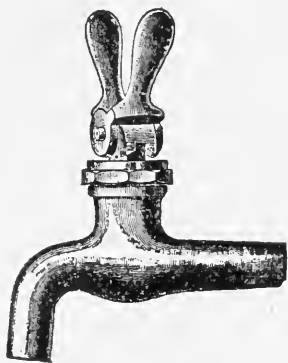
Size, inches.....	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Finished, per doz.....	\$24.00	28.00	34.00	44.00
Nickel Plated, per doz.....	28.00	32.00	40.00	54.00

### FULLER HOSE BIBBS FOR LEAD PIPE.

Size, inches.....	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
Finished, per doz.....	\$21.00	24.00	30.00	40.00
Nickel Plated, per doz.....	25.00	28.00	36.00	50.00

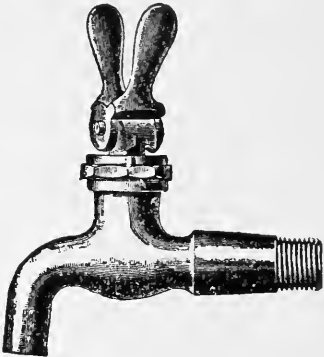


DOHERTY SELF-CLOSING WORK.



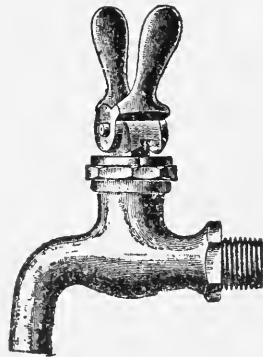
Self-Closing Plain Bibbs, for Lead Pipe.

Size.....	1/2	5/8	3/4
Finished.....per doz.	\$24.00	27.00	33.00
Nickel Plated... "	28.00	31.00	38.00



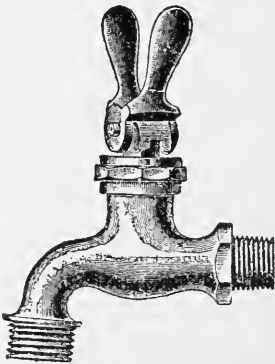
Self-Closing Bibbs, screw on tail iron pipe.

Size.....	1/2	5/8	3/4
Finished.....per doz.	\$28.00	31.00	37.00
Nickel Plated... "	32.00	35.00	42.00



Self-Closing Plain Bibbs, for Iron Pipe.

Size.....	1/2	5/8	3/4
Finished.....per doz.	\$28.00	31.00	37.00
Nickel Plated... "	32.00	35.00	42.00



Self-Closing Hose Bibbs, for Iron Pipe.

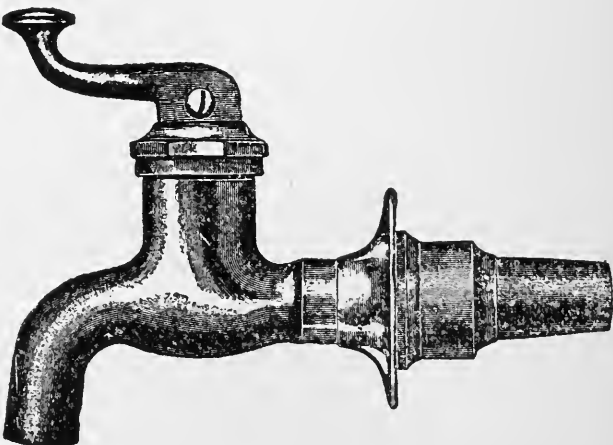
Size... ..	1/2	5/8	3/4
Finished.....per doz.	\$31.00	34.00	39.00
Nickel Plated... "	35.00	38.00	44.00

SELF-CLOSING PLAIN BIBBS.



Telegraph Handle. Screwed for Iron Pipe.

Size.....inches	3/8	1/2	5/8	3/4
Finished....per doz.	16.00	18.00	21.00	28.00
Nickel Plated, "	18.00	20.50	23.50	30.50



Flange and Thimble.

Size.....inches	3/8	1/2	5/8	3/4
Finished....per doz.	22.00	26.00	30.00	42.00
Nickel Plated, "	24.00	28.50	32.50	44.50



**BOSTON SELF-CLOSING  
PANTRY COCK.**

Finished ..... Per Doz. \$54.00  
Nickel Plated..... " 64.00



**BOSTON SELF-CLOSING  
BASIN COCK.**

Finished ..... Per Doz. \$42.00  
Nickel Plated..... " 48.00



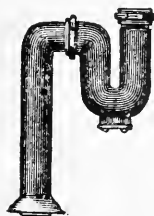
**DOHERTY SELF-CLOSING  
BASIN COCK.**

Finished ..... Per Doz. \$42.00  
Nickel Plated..... " 48.00



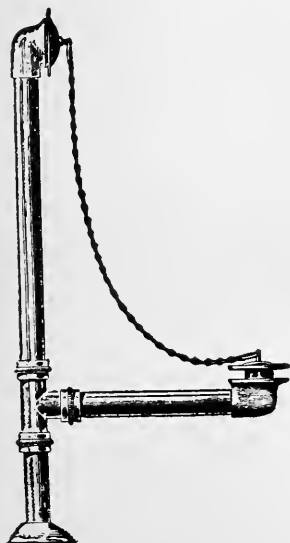
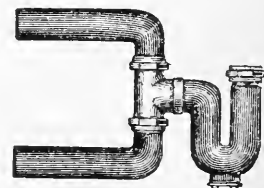
**ROUGH BRASS COMBINA-  
TION WASH TRAY WASTE.**

1½	inch	for 2 Wash Trays	.....	\$4.65
1½	"	3	"	..... 6.25
2	"	2	"	..... 6.50
2	"	3	"	..... 9.75



**ROUGH BRASS TRAPS FOR COM-  
BINATION WASH TRAY WASTE.**

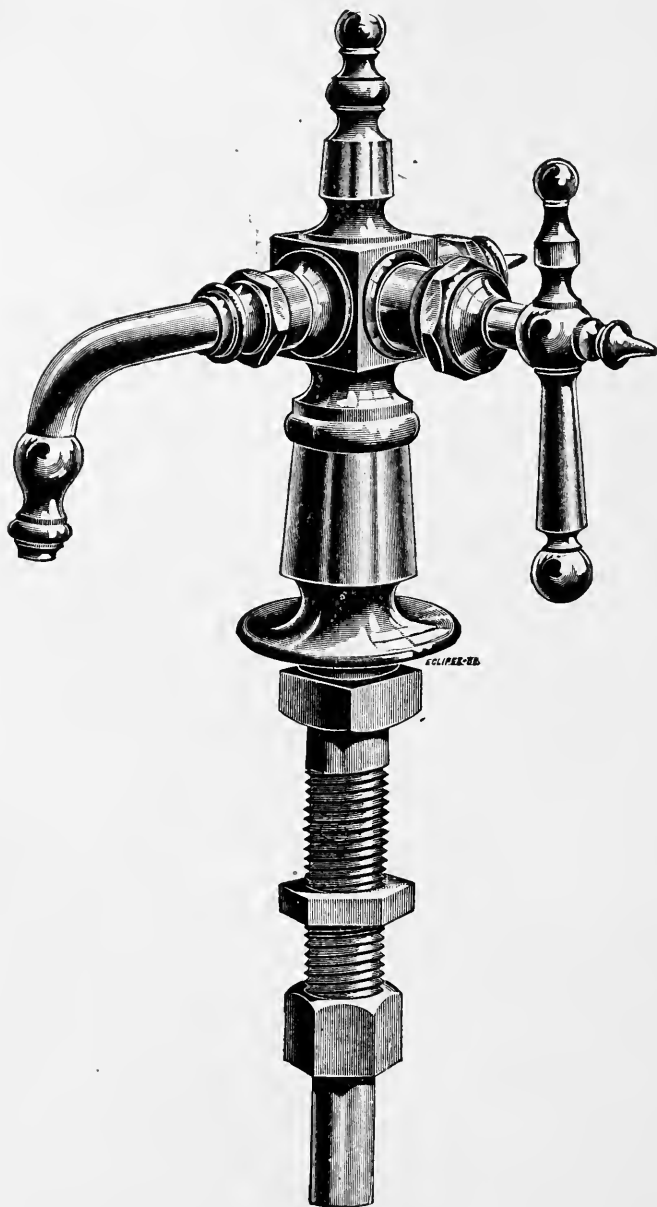
Without Vent.	1½ inch S Trap.	2 inch S Trap.
Each.....	\$3.00	\$5.50
Without Vent.	1½ inch ½ S Trap.	2 inch ½ S Trap.
Each.....	\$2.25	\$4.50
With Vent.	1½ inch S Trap.	2 inch S Trap.
Each.....	\$4.00	\$6.50
With Vent.	1½ inch ½ S Trap.	2 inch ½ S Trap.
Each.....	\$4.00	\$6.50



**CONNECTED WASTE AND OVERFLOW.**

1⅜ inch Brass N. P. Bath Tub Overflow and Waste, con-  
nection with Ell Top..... \$3.50  
1⅜ inch Brass N. P. Bath Tub Overflow and Waste con-  
nection with Ell Top, with Tee and Clean-Out Plug.. 3.60

## LYONS-FULLER BASIN COCK.



This cock can be used either right or left by removing the bibb and plug and replacing them on the proper side, adjusting them by means of a lock-nut, which is used also for preventing the bibb from leaking.

In this cock the construction of the valve is such as to insure entire freedom from "hammering" or "rattling."

An eccentric stem, in two parts, insures a positive seating of the valve at all times and a consequent freedom from leakage.

The valve being encased, is not exposed to water flowing through it, which insures the greatest possible durability.

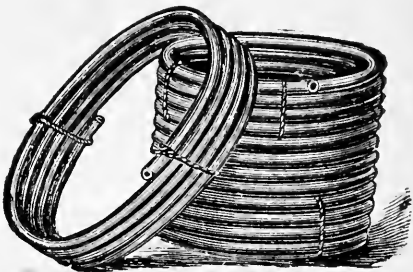
Nickel Plated, per doz. ----- \$30.00

LEAD PIPE.

SHEET LEAD, weight per square foot, pounds, 2½, 3, 3½, 4, 4½, 5, 6, 8, 9, 10 and upwards.

Lead Pipe or Sheet Lead cut to any lengths.

Lead Pipe and Sheet Lead furnished at lowest prices current at time of purchase.



Inside Diameter.....	⅜	½	⅝	¾	1	1¼	1½	1¾	2
AAA, weight per foot, lbs., oz.	1-12	3- 0	3- 8	4-12	6- 0	6-12	8- 8	10- 0	11-12
AA,     "     "     "	1- 8	2- 0	2-12	3- 8	4-12	5-12	7- 8	8- 8	9- 0
A,     "     "     "	1- 4	1-12	2- 8	3- 0	4- 0	4-12	6- 8	7- 0	8- 0
B,     "     "     "	1- 0	1- 4	2- 0	2- 4	3- 4	3-12	5- 0	6- 0	7- 0
C,     "     "     "	-12	1- 0	1- 8	1-12	2- 8	3- 0	4- 4	5- 0	6- 0
D,     "     "     "	-10	-12	1- 0	1- 4	2- 0	2- 8	3- 8	4- 0	4-12
E,     "     "     "	.....	- 9	-12	1- 0	1- 8	2- 0	3- 0	.....	.....

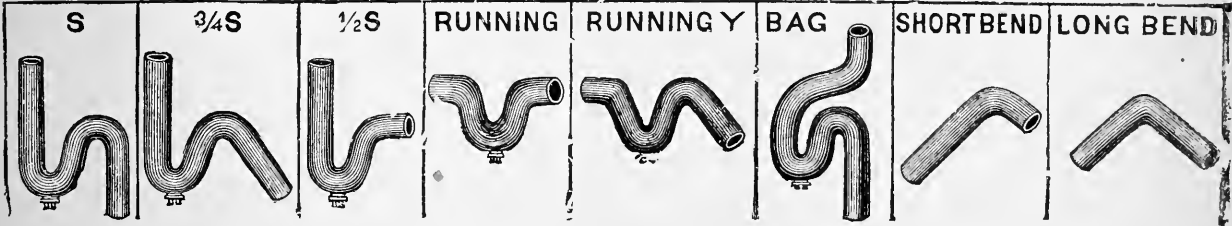
LEAD WASTE PIPE, 1½ and 2 inch, 2 and 3 lbs.; 3 inch, 3½ and 5 lbs.; 3½ inch, 4 lbs.; 4 inch, 5, 6 and 8 lbs. per foot.

TABLE SHOWING THE WEIGHT OF PIPE WHICH SHOULD BE USED FOR A GIVEN HEAD OF WATER.

Head or number of feet fall.	Pressure per square inch.	CALIBRE AND WEIGHT PER FOOT.						
		Letter.	⅜ inch.	½ inch.	⅝ inch.	¾ inch.	1 inch.	1¼ in.
30 feet.	15 lbs.	D	10 oz.	¾ lb.	1 lb.	1¼ lbs.	2 lbs.	2½ lbs.
50 "	25 "	C	12 "	1 "	1½ lbs.	1¾ "	2½ "	3 "
75 "	38 "	B	1 lb.	1¼ lbs.	2 "	2¼ "	3¼ "	3¾ "
100 "	50 "	A	1¼ lbs.	1¾ "	2½ "	3 "	4 "	4¾ "
150 "	75 "	AA	1½ "	2 "	2¾ "	3½ "	4¾ "	5¾ "
200 "	100 "	AAA	1¾ "	3 "	3½ "	4¾ "	6 "	6¾ "

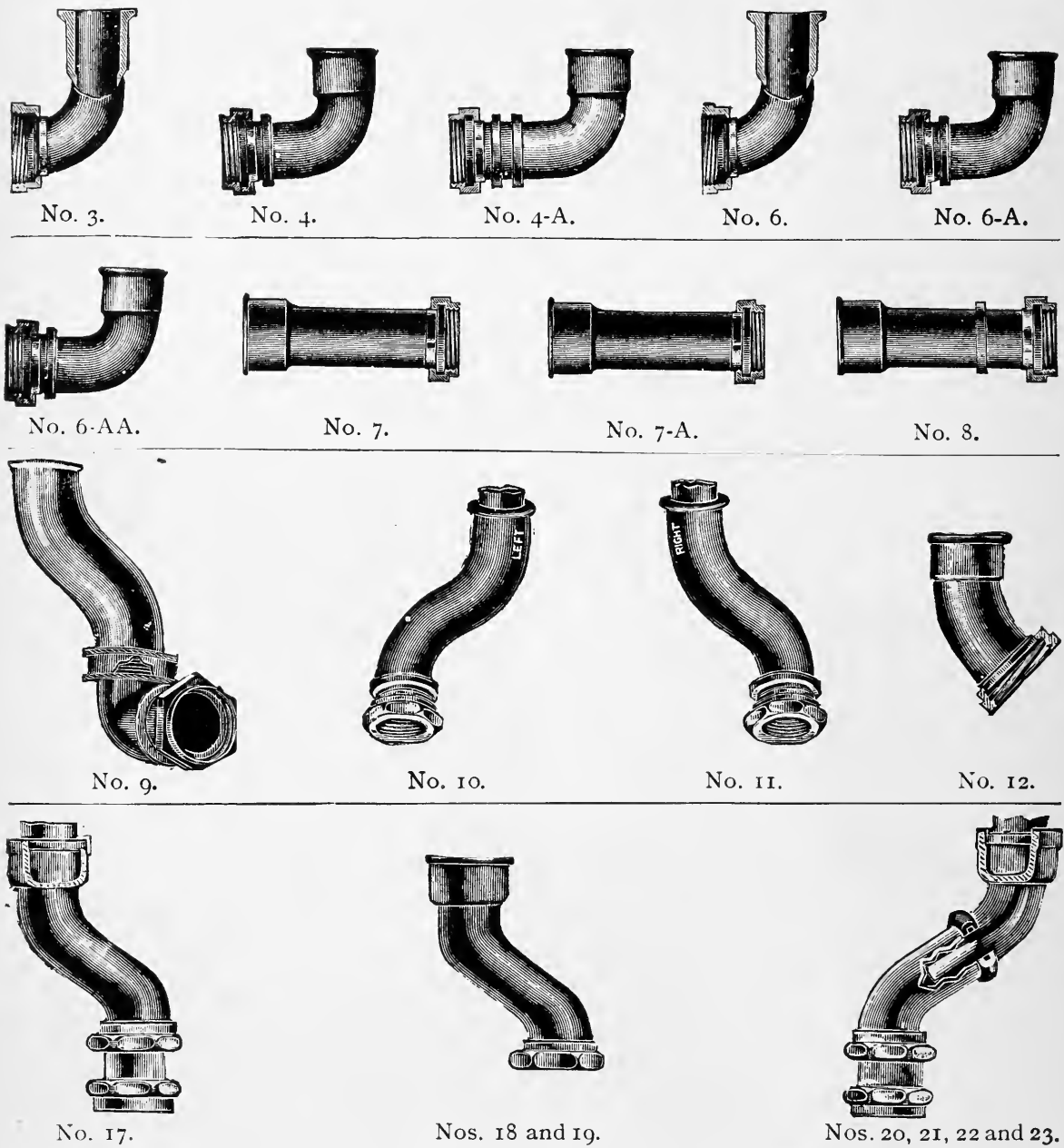
BLOCK TIN PIPE, ⅜ inch, 4, 4½, 6½ and 8 oz.; ½ inch, 6, 7½ and 10 oz.; ⅝ inch, 8 and 10 oz.; ¾ inch, 10 and 12 oz.; 1 inch, 15 and 18 oz.; 1¼ inch, 1¾ and 1½ lbs.; 1½ inch, 2 and 2½ lbs.; 2 inch, 2½ and 3 lbs. per foot.

THE "DU BOIS" LEAD TRAPS.



Size Trap, in.....	Standard (Lightest) Weight						Special (Med.) Wt						Extra Heavy Weight.							
	1¼ lbs.	2 lbs.	3 lbs.	5 lbs.	5½ lbs.	8 lbs.	2½ lbs.	3 lbs.	4 lbs.	6 lbs.	2½ lbs.	3½ lbs.	4¾ lbs.	5 lbs.	6 lbs.	8 lbs.	10 lbs.	1¼ lbs.	1½ lbs.	2 lbs.
Full S.....	.56	.64	1.03	2.03	2.46	3.73	.78	.86	1.34	2.48	.77	1.05	1.58	1.65	2.36	3.38	4.65	.77	.86	1.34
¾ S.....	.51	.58	.97	1.97	2.08	3.65	.70	.78	1.24	2.33	.70	.96	1.46	1.53	2.26	3.08	4.47	.70	.96	1.46
½ S or P.....	.49	.56	.90	1.67	1.76	2.93	.68	.72	1.15	1.92	.67	.91	1.35	1.42	1.95	2.57	3.61	.67	.91	1.35
Running.....	.43	.51	.80	1.56	1.61	2.87	.61	.69	1.03	1.80	.59	.83	1.19	1.27	1.78	2.42	3.57	.59	.83	1.19
Running Y.....	.46	.54	.88	1.84	2.05	3.67	.66	.75	1.12	2.31	.62	.88	1.30	1.38	2.19	3.05	4.47	.62	.88	1.30
Bag.....	.64	.75	1.26	2.55	3.20	5.25	.90	1.03	1.64	3.47	.90	1.24	1.94	2.01	3.05	4.72	6.45	.90	1.24	1.94
Long Bend.....	.29	.36	.58	1.07	1.32	2.20	.46	.53	.77	1.47	.43	.64	.92	.95	1.24	1.93	2.78	.43	.64	.92
Short Bend.....	.23	.29	.43	.83	1.01	1.85	.35	.41	.56	1.12	.29	.51	.65	.70	.94	1.47	2.14	.29	.51	.65

FLEXIBLE RUBBER WATER CLOSET CONNECTIONS.



No. 3.		\$ 8.25	Per Doz.
4, full length 4 inches from face to back.		10.00	" "
4-A, full length 5 inches from face to back.		11.00	" "
6, for 2-inch vent, to slip over 2" lead pipe		15.00	" "
6-A, for 2-inch vent, to slip over 1½" iron or lead pipe.		15.00	" "
6-AA, for 1½-inch Syphon Supply.		15.00	" "
7, for 1¼ Supply.		7.00	" "
7-A, for 1½" Syphon Jet, to slip over 1½" lead or brass pipe.		9.00	" "
8, for 2" vent, to slip over 2" iron or lead pipe.		14.00	" "
9, Syphon jet connection. Interchangeable R. and L. to centre of closet. All rubber. 1¼", \$18.50 per dozen. 1½"		24.00	" "
Nos. 10 and 11, R. and L. in one piece (as shown). All rubber. To offset to centre of closet. 1¼", \$15.00 per dozen. 1½"		18.00	" "
No. 12, 45° Elbow. 1¼", \$9.00 per dozen. 1½"		12.00	" "
17, Off-et connection 3½ C. to C. Nickel plated. With patent flexible socket for flush pipe and rubber connection to closet. 1¼", \$30.00 per dozen. 1½"		36.00	" "
18, Offset 3½" from centre to centre, 1¼"		12.50	" "
19, 1½"		16.00	" "
Nos. 20, 21, 22 and 23, with telescoping and interchangeable connection to make R. and L. connection as desired. With patent flexible joints at both ends, as in other fitting, Nickel-plated. No. 20, 1¼" offset, \$35.00 per dozen; No. 21, 1½" offset, \$40.00 per dozen; No. 22, 1¼" 45°, \$35.00 per dozen; No. 23. 1½" 45°		40.00	" "

## BRASS FERRULES.

STRAIGHT, FOR LIGHT OR EXTRA HEAVY SOIL PIPE.



Size, inches.....	2	3	4	5	6
Per doz.....	\$5.00	10.00	13.00	27.00	36.00

## STRAIGHT REDUCING FERRULES.

FOR LIGHT OR EXTRA HEAVY PIPE.

Inches inside Dia.....	2x1 $\frac{1}{4}$	2x1 $\frac{1}{2}$	2 $\frac{1}{4}$ x2	2 $\frac{1}{2}$ x1 $\frac{1}{2}$	2 $\frac{1}{2}$ x2 $\frac{1}{8}$	2 $\frac{1}{2}$ x2 $\frac{1}{8}$
Per dozen.....	\$5.00	6.00	7.00	9.00	9.00	8.50

Inches inside Dia.....	3x1 $\frac{1}{2}$	3x2 $\frac{1}{4}$	3 $\frac{1}{2}$ x3	3 $\frac{1}{2}$ x3 $\frac{1}{8}$	4 $\frac{1}{2}$ x4	4 $\frac{1}{2}$ x4 $\frac{1}{8}$
Per dozen.....	\$11.00	11.00	12.00	13.00	16.00	16.50



## STRAIGHT FERRULES WITH HUB.

FOR LIGHT PIPE.

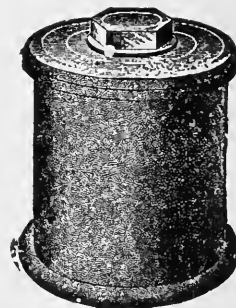


Inches inside Dia .....	2	3	4
Per dozen.....	\$9.00	13.00	16.00
Extra Heavy, Extra Long.....	11.00	----	20.00

## TRAP SCREW FERRULES.

FOR LIGHT AND EXTRA HEAVY PIPE.

Size, inches.....	2	3	4	5	6
Per dozen.....	\$10.00	15.00	24.00	50.00	60.00
Extra Heavy, per dozen..	15.00	25.00	35.00	54.00	72.00



## EIGHTH BEND FERRULES.

FOR LIGHT PIPE.

With Plain End.

With Hub End.

No.....	48	49	50	51	52	53
Inches inside Dia ..	2	3	4	2	3	4
" Length.....	3 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{3}{4}$	3 $\frac{1}{2}$	3 $\frac{1}{8}$	3 $\frac{1}{2}$
Per dozen.....	\$9.00	13.50	18.00	9.50	14.50	19.00



CAST IRON PIPE AND FITTINGS.

SUITABLE FOR SEWER, DRAIN,, WATER AND SMOKE.



Single Hub.										
Diameter of Pipe.....	2	3	4	5	6	7	8	10	12	15
Pipe, Single Hub, per foot....	.24	.30	.40	.50	.60	1.00	1.25	2.00	3.00	4.50
" " " extra heavy, .35		.55	.75	1.00	1.20	1.75	2.25	3.00	4.00	....



Double Hub.										
Diameter of Pipe.....	2	3	4	5	6	7	8	10		
Pipe, Double Hub, per length, 5 feet.....	1.50	1.80	2.30	2.80	3.30	5.75	7.25	13.00		
" " " " " extra heavy.	2.05	3.05	4.05	5.30	6.30	9.75	12.75	18.00		

Size.....										
Quarter Bends.....	2	3	4	5	6	7	8	10	12	
Quarter Bends, }										
extra heavy, }	.40	.55	.75	1.00	1.20	2.25	3.00	4.00	6.00	
Quarter Bends with 2-inch inlet, 50c.; 3-inch, 50c.; 4-inch, 50c. each extra.	.50	.70	1.10	1.35	1.75	3.00	4.00	5.00	8.00	

Size.....										
Long Bends, 18 inches.....	2	3	4	5	6					
" " 18 " extra heavy.	.80	1.10	1.50	2.25	2.50					
	1.00	1.80	2.25	3.00	3.50					

Size.....										
One-fifth Bends.....	2	3	4	5	6					
" " " extra heavy.....	.40	.55	.75	1.00	1.20					
	.50	.70	1.10	1.35	1.75					

Size.....										
One-Sixth Bends.....	2	3	4	5	6					
" " " extra heavy.....	.40	.55	.75	1.00	1.20					
	.50	.70	1.10	1.35	1.75					

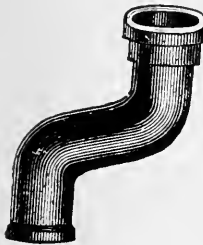
Size.....										
One-eighth Bends...	2	3	4	5	6	7	8	10	12	
One eighth Bends, }										
extra heavy }	.40	.55	.75	1.00	1.20	2.25	3.00	4.00	6.00	
	.50	.70	1.10	1.35	1.75	3.00	4.00	5.00	8.00	

Size.....										
One-sixteenth Bends..	2	3	4	5	6	7	8	10	12	
One-sixteenth Bends, }										
extra heavy }	.40	.55	.75	1.00	1.20	2.25	3.00	4.00	6.00	
	.50	.70	1.10	1.35	1.75	3.00	4.00	5.00	8.00	



CAST IRON PIPE AND FITTINGS.—Continued.


CAST IRON OFFSETS.—STANDARD.

	Sizes	2	3	4	5	6
	Offsets, to offset 2 inches	\$0.40		\$0.80		
	“ “ 4 “	.50	\$0.75	.85	\$1.40	\$2.00
	“ “ 6 “	.60	.80	1.00	1.60	2.25
	“ “ 8 “	.70	.90	1.15	1.80	2.40
	“ “ 10 “	.80	.95	1.25	1.90	2.60
	“ “ 12 “	.85	1.00	1.40	2.00	2.75
	“ “ 14 “	1.00	1.25	1.65		
	“ “ 16 “	1.15	1.40	1.80	2.40	
	“ “ 18 “	1.25	1.50	2.15		
	“ “ 20 “	1.40	1.75	2.25		

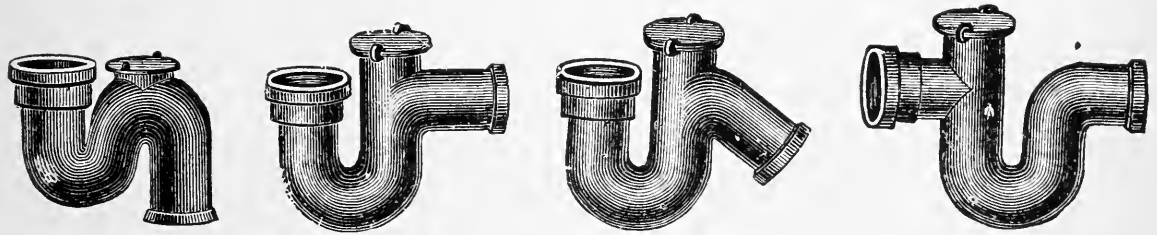
CAST IRON OFFSETS.—EXTRA HEAVY.

Sizes	2	3	4	5	6
Offsets to offset 2 inches	\$0.60		\$1.20		
“ “ 4 “	.90	\$1.10	1.25	\$1.80	\$3.00
“ “ 6 “	1.00	1.20	1.40	2.00	3.25
“ “ 8 “	1.10	1.35	1.50	2.25	3.50
“ “ 10 “	1.20	1.40	1.60	2.40	3.75
“ “ 12 “	1.25	1.45	1.80	2.50	4.00
“ “ 14 “	1.45	1.70	2.00		
“ “ 16 “	1.60	1.90	2.25	3.00	
“ “ 18 “	1.75	2.00	2.80		
“ “ 20 “	1.95	2.25	3.00		

OFFSETS WITH 2-INCH OUTLET.

	Extra Heavy.		Extra Heavy.	
	4 inch to offset 4 inch	\$1.35 \$1.75	4 inch to offset 14 inch	\$2.15 \$2.50
	4 “ “ 6 “	1.50 1.90	4 “ “ 16 “	2.30 2.75
	4 “ “ 8 “	1.65 2.00	4 “ “ 18 “	2.55 3.20
	4 “ “ 10 “	1.75 2.10	4 “ “ 20 “	2.75 4.00
	4 “ “ 12 “	1.90 2.30		

CAST IRON TRAPS.



Full S Trap, Half S Trap, Three-quarter S Trap and Running Trap.

With or Without Hand Hole and Covers.

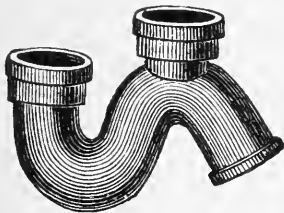
Sizes	2	3	4	5	6	7	8	10	12
Standard	\$0.80	1.25	1.75	3.00	4.00	7.00	9.00		
Extra Heavy	1.25	2.00	2.75	4.00	5.50	9.00	12.00	20.00	30.00

S, 1/2S AND 3/4S TRAPS.—With one 2-inch Top Vent or Side Inlet.

Sizes	2	3	4	5	7	6	8
Standard	\$1.30	1.75	2.25	3.50	4.50	7.50	9.50
Extra Heavy	1.75	2.50	3.25	4.50	6.00	9.50	12.00

CAST IRON TRAPS.—Continued.

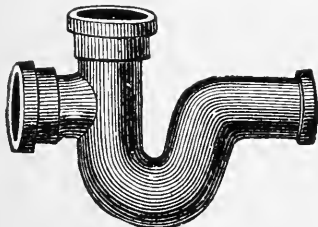
S, HALF S AND THREE-QUARTER S TRAPS,  
With one 3-inch Top Vent, or Side Inlet.



Sizes.....	3	4	5	6	7	8
Standard .....	\$1.85	2.35	3.60	4.60	7.60	9.60
Extra Heavy.....	2.60	3.35	4.60	6.10	9.60	12.60

S, HALF S AND THREE-QUARTER S TRAPS,  
With one 4-inch Top Vent, or Side Inlet.

Sizes.....	4	5	6	7	8
Standard .....	\$2.50	3.75	4.75	7.75	9.75
Extra Heavy.....	3.50	4.75	6.25	9.75	12.75

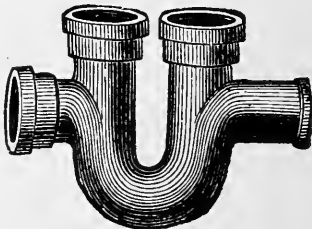


RUNNING TRAPS, with Hub for Vent.

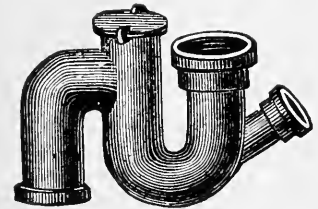
Sizes.....	2	3	4	5	6	7	8	10	12
Size Vent .....	2	3	4	4	4	6	6	6	6
Standard.....	\$1.30	1.85	2.50	3.75	4.75	7.75	9.75	20.00	30.00
Extra Heavy.....	1.75	2.60	3.50	4.75	6.25	9.75	12.75	22.00	32.00

RUNNING TRAPS, with Hubs for Double Vent.

Sizes.....	2	3	4	5	6	7	8	10	12
Size Vent.....	2	3	4	4	4	6	6	6	6
Standard .....	\$1.80	2.45	3.25	4.50	5.50	9.00	11.00	21.00	31.00
Extra Heavy.....	2.25	3.20	4.25	5.50	7.00	12.00	14.00	23.00	33.00



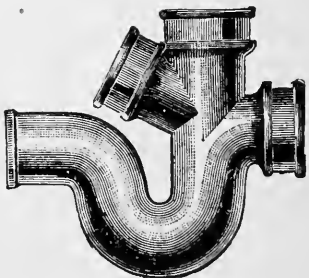
TRAPS, with Hand Hole, Cover and Outlet.



	Standard.	Extra Heavy.
4-inch S Trap.....	\$2.25	\$3.25
4-inch 1/2 S Trap.....	2.25	3.25
4-inch 3/4 S Trap.....	2.25	3.25

Y BRANCH RUNNING TRAP.

Diameter of Pipe.....	4	5	6
Extra Heavy.....	\$4.00	5.50	7.00



LONG HALF S TRAP, no Hand Hole.

4-inch, 15 inches long.....	Each, \$2.25
4-inch, 18 " " .....	" 2.40
4-inch, 24 " " .....	" 2.75

# CAST IRON PIPE AND FITTINGS. — Continued.

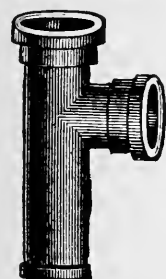


Size.....	2	3	4	5	6
Double Hub, Quarter Bends.....	.70	.85	.95	1.30	1.50
“ “ “ extra heavy.....	.80	1.00	1.40	1.65	2.05

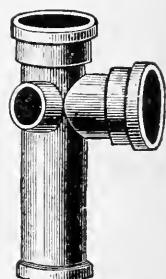
Size.....	2	4
Double Hub, Eighth Bends.....	.70	.95
“ “ “ extra heavy.....	.80	1.40



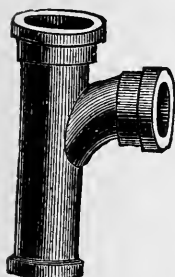
Size.....	2	3	4	5	6
Return Bends.....	.65	.85	1.25	2.00	3.00
“ “ extra heavy.....	.75	1.10	1.75	2.75	4.00



Size.....	2	3	4	5	6	7	8	10
Tee Branches.....	.60	.80	1.20	1.60	2.00	4.00	5.00	7.00
Tee Branches, extra heavy, }	.80	1.25	1.60	2.25	3.25	6.00	8.00	11.00
Long Tee Branches 24 inches clear, }	-----	-----	2.50	-----	-----	-----	-----	-----
Long Tee Branches 24 inches clear, extra heavy, }	-----	-----	3.50	-----	-----	-----	-----	-----



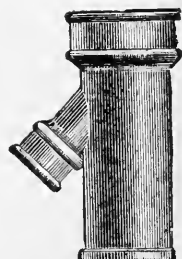
For T Branches with 2" side inlet, R. or L., add 50 cents to above list.



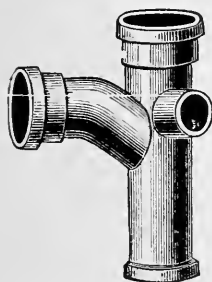
Size.....	2	3	4	5	6	7	8
Tee Y Branches.....	.60	.80	1.20	1.60	2.00	4.00	5.00
Tee Y Branches, extra heavy, }	.80	1.25	1.60	2.25	3.25	6.00	8.00

## INVERTED Y.

4x2 inch.....	\$1.50
Extra heavy.....	2.00

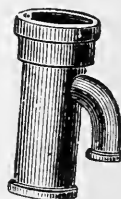


## T Y WITH 2-INCH INLET, RIGHT OR LEFT.

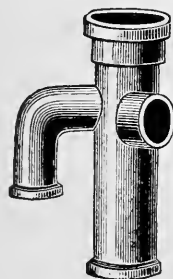


Size.....	2	3	4	5	6	7	8
Each.....	1.10	1.30	1.70	2.10	2.50	4.50	5.50
Extra heavy---	1.30	1.75	2.10	2.75	3.75	6.50	8.50

Size.....	2	3	4	5	6
Ventilating Ys.....	.80	1.25	1.50	2.00	3.00
“ “ extra heavy.....	1.25	1.75	2.00	2.75	4.00




## VENTILATING Y WITH 2-INCH INLET, RIGHT OR LEFT.

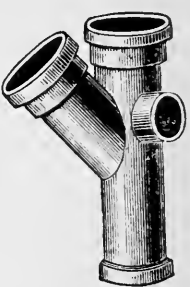


Size.....	2	3	4	5	6
Each.....	1.30	1.75	2.00	2.50	3.50
Extra heavy.....	1.75	2.25	2.50	3.25	4.50


CAST IRON PIPE AND FITTINGS.—Continued.



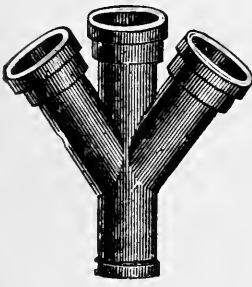
Size.....	2	3	4	5	6	7	8	10
Y Branches.....	.60	.80	1.20	1.60	2.00	4.00	5.00	7.00
Y “ extra heavy.....	.80	1.25	1.60	2.25	3.25	6.00	8.00	11.00



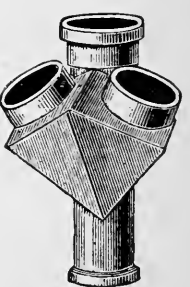
WITH TWO INCH INLET RIGHT OR LEFT.



Size .....	2	3	4	5	6	7	8
Half Y Branches.....	.60	.80	1.20	1.60	2.00	4.00	5.00
“ Y “ extra heavy.....	.80	1.25	1.60	2.25	3.25	6.00	8.00




Size .....	2	3	4	5	6	7	8
Double Y Branches..	1.00	1.25	1.65	2.25	3.00	5.50	6.00
Double Y Branches, } extra heavy.....	1.25	1.60	2.00	3.00	4.00	7.00	9.00

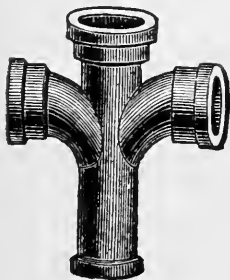


ANGLE Y's.

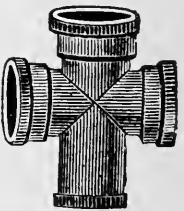
4 x 4.....	3.50,	extra heavy	4.50
5 x 4.....	4.50	“	“ 5.75
6 x 4.....	5.50	“	“ 7.50

Size .....	2	3	4	5	6	7	8
Double Half Y Branches...	1.00	1.25	1.65	2.25	3.00	5.50	6.00
Double Half Y Branches, } extra heavy.....	1.25	1.60	2.00	3.00	4.00	7.00	9.00

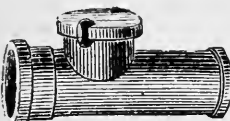




Sizes .....	2	3	4	5	6	7	8
Double T Y Branches..	1.00	1.25	1.65	2.25	3.00	5.50	6.00
Double T Y Branches, } extra heavy.....	1.25	1.60	2.00	3.00	4.00	7.00	9.00
Cross Head Branches..	1.00	1.25	1.65	2.25	3.00	5.50	6.00
Cross Head Branches, } extra heavy.....	1.25	1.60	2.00	3.00	4.00	7.00	9.00



Cross Heads.




Size .....	4	5	6
Hand Hole Tees.....	1.25	1.75	2.25
“ “ “ extra heavy.....	1.75	2.25	3.00

INCREASERS. Hub End to Govern Price.

Sizes .....	3	4	5	6	7	8	10	12
Standard .....	\$0.70	.90	1.15	1.25	1.60	2.00	4.00	6.00
Extra Heavy .....	1.00	1.25	1.75	2.25	2.75	5.00	6.50	8.50

# CAST IRON PIPE AND FITTINGS.—Continued.


	Size.....	2	3	4	5	6	7	8
	Single Hubs.....	\$0.25	.35	.40	.60	.75	1.25	2.50
	“ “ extra heavy.....	.35	.40	.50	.75	1.00	2.00	3.00

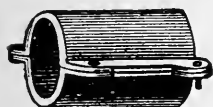
Size.....	2	3	4	5	6	7	8	10	
Double Hubs.....	\$0.30	.45	.65	.75	.80	1.40	2.50	3.50	
“ “ extra heavy.....	.40	.55	.75	.90	1.15	2.50	3.50	5.50	




## REDUCERS. Spigot End to Govern Prices.

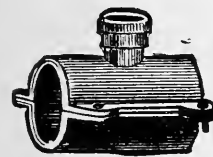
Size.....	2	3	4	5	6	7	8	10
Reducers.....	\$0.30	.45	.65	.75	.80	1.40	2.50	3.50
“ extra heavy.....	.40	.55	.75	.90	1.15	2.50	3.50	4.50


Size.....	2	3	4	5	6	7	8	
Sleeves.....	\$0.30	.45	.65	.75	.80	1.40	2.50	
“ extra heavy.....	.40	.55	.75	.90	1.15	2.50	3.50	




Size.....	2	3	4	5	6
Bands.....	\$0.45	.55	.70	1.00	1.40
“ extra heavy.....	.90	1.00	1.50	2.00	2.75


Size.....	2	3	4	5	6	8	
Thimbles, with covers.....	\$0.40	.50	.60	.70	.90	2.25	



Size.....	2	3	4	5	6	
Bands with Outlets.....	\$0.75	.90	1.10	1.45	1.90	
Extra heavy.....	1.50	1.75	2.00	2.75	3.50	


Diameter of Pipes.....	2	3	4	5	6	
Ventilating Caps, Short.....	\$0.40	.60	.80	1.10	1.50	
“ “ Long.....	.75	1.05	1.35	1.85	2.40	



Size.....	2	3	4	5	6	8	
Saddle Hubs.....	\$0.30	.50	.60	.75	1.10	1.50	
“ “ extra heavy.....	.40	.65	.80	1.00	1.40	2.25	




Size.....	2	3	4	5	6
Saddle Y's and Half Y's.....	\$0.35	.55	.70	.90	1.25
“ “ “ “ extra heavy.....	.45	.70	.90	1.15	1.55

Size.....	2	3	4	5	6	7	8	
Pipe Stoppers.....	\$0.15	.25	.30	.35	.50	.90	1.20	
“ “ extra heavy.....	.25	.35	.40	.50	.65	1.25	1.50	


## TRAP COVERS.

Diameter of Pipes.....	2	3	4	5	6	8
Trap Covers.....	\$0.12	.16	.20	.30	.40	.60

Diameter of Pipes.....	2	3	4	5	6	7	8	
Pipe Rests.....	\$0.30	.40	.50	.60	.70	1.00	1.10	



Diameter of Pipes.....	2	3	4	5	6	8
Pipe Hooks.....	\$0.08	.10	.12	.15	.20	.40

Diameter of Pipes.....	2	3	4	5	6	
Roof Irons.....	\$0.90	1.15	1.30	1.50	1.80	

SINK COUPLINGS.



	Plain.	Galvanized.
Common, per dozen.....	1.50	2.00

SINK BOLTS.

Per dozen.....	.40	Nickel-Plated. 1.75	Plain, per package (100). 2.00
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IRON SINK TRAPS.

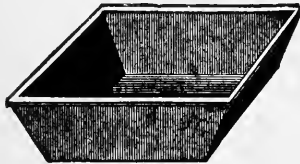
FOR IRON OR LEAD PIPE CONNECTIONS.

Half S, Three-Quarter S, or Full S.....	Each, 1.25
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HYDRANT CESS POOLS.

DEPTH, 6 INCHES.



Size.....	12 x 12	14 x 14	16 x 16	18 x 18
Price.....	1.00	1.15	1.30	1.60

HYDRANT CESS POOLS

WITH BELL TRAPS.

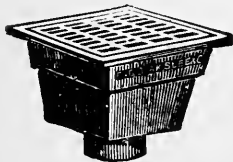
Size .....	12 x 12 x 6	14 x 14 x 6	16 x 16 x 6
Price .....	1.50	1.65	1.80



CESS POOLS.

WITH BELL TRAP AND GRATING.

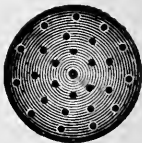
16 inches square x 10 inches deep; Outlet, 4.



Price.....	\$4.50
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ROUND CESS POOL PLATES.

Diameter, Inches..	4	5	6	7	8	9	10	12
Price.....	.20	.25	.30	.40	.60	.70	.80	1.00



CESS POOL PLATES.

WITH BARS.



Size, ins. square, 4x4	5x5	6x6	7x7	8x6	8x8	9x9	10x10	11x11	12x12	14x14	16x16
Price.....	.20	.25	.30	.40	.50	.60	.70	.80	.90	1.00	1.50

CESS POOL PLATES.

WITH HOLES.

Size, inches square..	4	5	6	7	8	10	12
Price .....	.20	.25	.30	.40	.60	.80	1.00



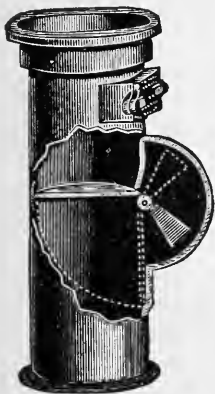
SIDEWALK GRATES.



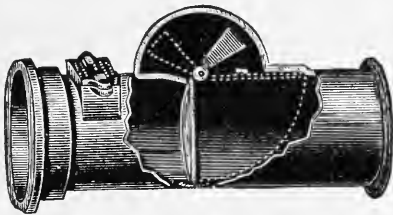
Plain, Square or Oval.....	2.00
Galvanized .....	3.00

SEWER GAS AND BACK WATER TRAP.

PENNIE'S PATENT.



Upright Trap.



Horizontal Trap.

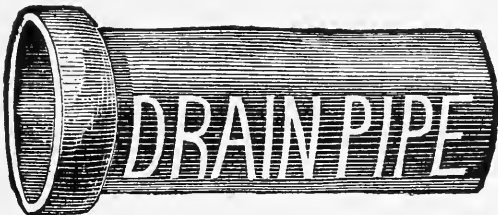
The above can also be used in an inclined position.

A perfect seal against Back Water, Sewer Gas, Draft and Vermin; Simple Self-Acting and Air-tight.

Size, in.....	3	4	5	6	8
Price.....	\$6.00	8.00	11.00	13.00	22.00

Size, in.....	10	12
Price.....	50.00	60.00

GLAZED EARTHEN



Size.....inches	2	3	4	5	6	7	8	9	10	12	15	18	20	22	24
Per foot.....	.14	.16	.20	.25	.30	.38	.45	.55	.65	.85	1.25	1.70	2.25	2.75	3.25
Bends and L's..each	.40	.50	.65	.85	1.10	1.50	1.80	2.25	2.75	3.50	4.75	6.50	7.50	9.00	11.00
Single Branches....	.49	.56	.70	.88	1.05	1.33	1.58	1.93	2.28	2.98	4.38	5.95	7.88	9.63	11.38
Double & V Branches....	1.00	1.50	2.00	2.50	3.50	4.50	5.50	6.50	7.50	10.00	.....	.....	.....	.....	.....
Traps.....each	1.00	1.50	2.00	2.50	3.50	4.50	5.50	6.50	7.50	10.00	.....	.....	.....	.....	.....

When Branches are 2 feet long, add price of 1 foot of pipe, and when 3 feet long, price of 2 feet to this list.

REDUCERS AND INCREASERS.—Measured at largest opening, and charged for on the basis of 4 feet of pipe, corresponding with internal diameter of opening.

SLANTS, 12, 18, 24 and 36 inches long, (measured on long side), price of plain pipe with 50 per cent. added.

“HANDY” FORCE AND SUCTION PUMPS.

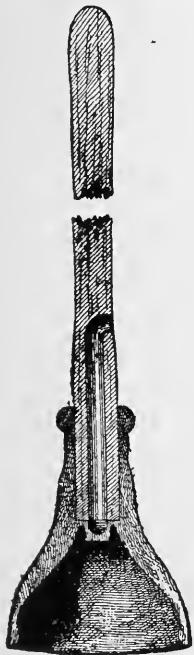
Will force out obstructions in any Closet, Bowl, Sink, Tub or Urinal.  
Length of Handle, 4 feet. Weight less than 2 lbs.

List, each ----- \$3.75

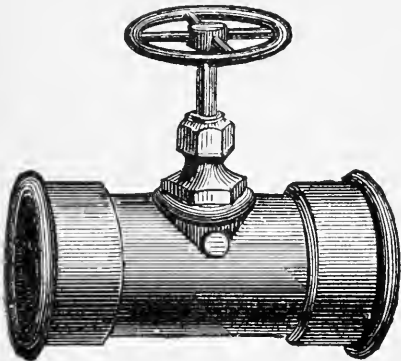
DIRECTIONS FOR USING.

In the water closet force the rubber plunger down through the bowl into the trap, then draw up and down as a churn. To force out small waste-pipes, such as bathtubs, wash bowls, sinks and urinals: First, fill bowl partly full of water, then place the rubber plunger over the mouth of the pipe and force down on the handle hard and fast until the stoppage is removed. Do not lift rubber clear of the bottom of the bowl. Use only the elasticity or spring of the rubber. The overflow holes or other vents should be stopped up so that full pressure may reach the obstruction.

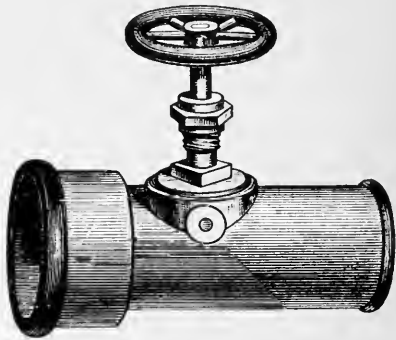
Section cut showing Valve and Air Passage.



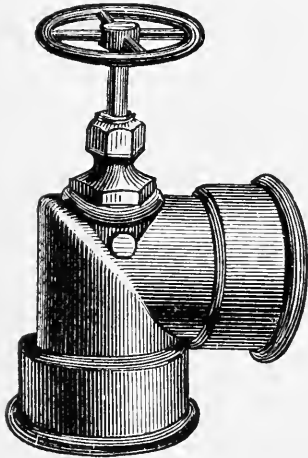




No. 2.



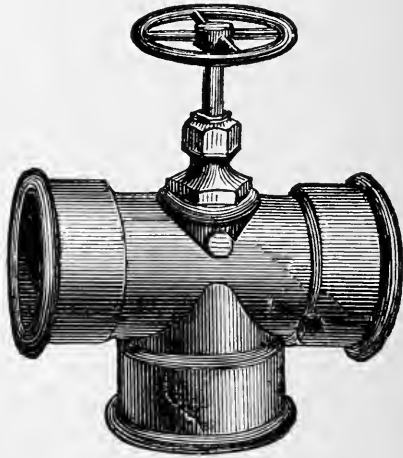
No. 2 A.



No. 2 Angle.



Expansion Tank.  
Outlets to suit require-  
ments.  
Price on application.



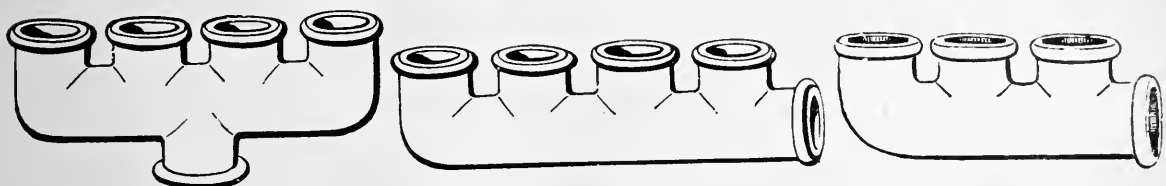
No. 2 Tee.

HEATING PIPE, PIPE FITTINGS AND VALVES.

Heating Pipes, 4 inches external diameter, cast in 9 foot lengths, weighing		
11 to 12 pounds to the foot.....	per foot	.30
Elbows Nos. 1, 2, 3, 5, 6 and 33.....	each	.65
Sleeves and Double Hubs, Nos. 24 and 50.....	"	.40
Returns and Offsets, Nos. 15, 23, 41, 53 and 54.....	"	.85
Branches, Tees, etc., Nos. 7, 11, 12, 13, 14, 16, 30 and 31.....	"	1.10
Branches, Nos. 17 and 20.....	"	1.75
Branches, Nos. 35 and 37.....	"	2.20
Reducing Elbows Nos. 44, 46 and 51.....	"	.80
Reducing Couplings, Nos. 45, 47 and 52.....	"	.70

	Size of valve passage.	Inside diam. of socket.		
Stop Valves (Brass Mounted), No. 2.....	2½ inches	4½ inches	"	5.00
" " " " " 2 A.....	2½ "	4½ "	"	5.00
" " " " " 2 Angle.....	2½ "	4½ "	"	5.50
" " " " " 2 Tee.....	2½ "	4½ "	"	5.75

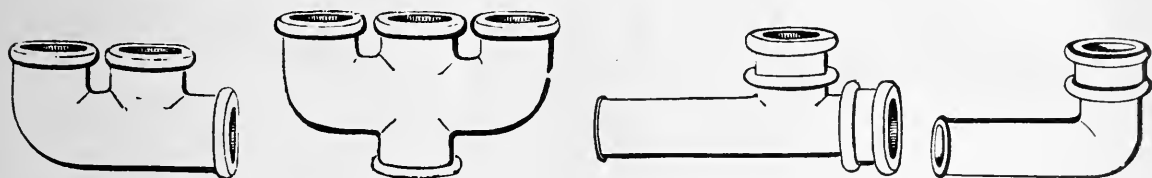
GREENHOUSE PIPE AND FITTINGS.



No. 37.

No. 35.

No. 17.

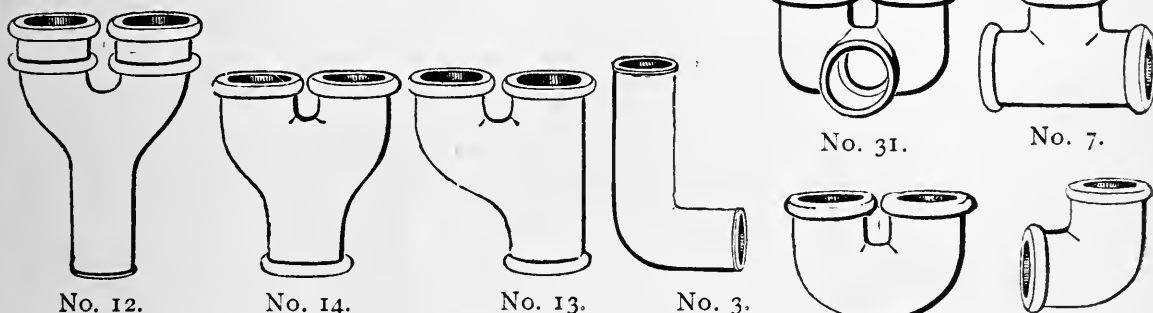


No. 16.

No. 20.

No. 11.

No. 33.



No. 12.

No. 14.

No. 13.

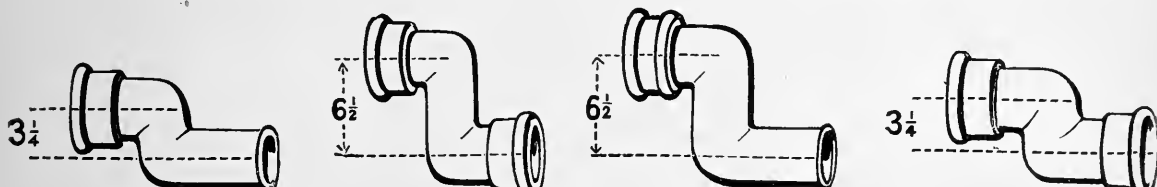
No. 3.

No. 31.

No. 7.

No. 15.

No. 1.

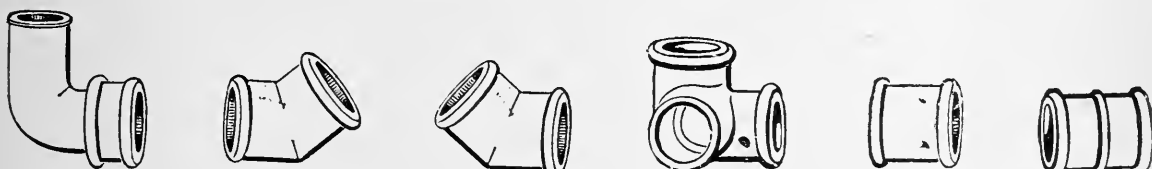


No. 54.

No. 23.

No. 41.

No. 53.



No. 2.

No. 6.  
Hexagon.

No. 5.  
Octagon.

No. 30.

No. 24.  
Dbl. Hub.

No. 50.  
Sleeve.



No. 51.

No. 52.

No. 44.

No. 45.

No. 46.

No. 47.

Socket,  $4\frac{1}{2}$ -inch internal diameter, and tapped opening for  $2\frac{1}{2}$ -inch pipe.

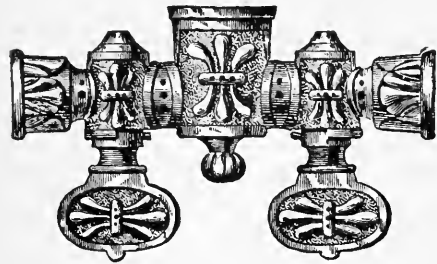
Socket,  $4\frac{1}{2}$ -inch internal diameter, and tapped opening for 2-inch pipe.

Socket,  $4\frac{1}{2}$ -inch internal diameter, and tapped opening for  $1\frac{1}{2}$ -inch pipe.

Or the same fittings with sockets  $4\frac{7}{8}$ -inch internal diameter if so ordered.

Greenhouse Pipe.

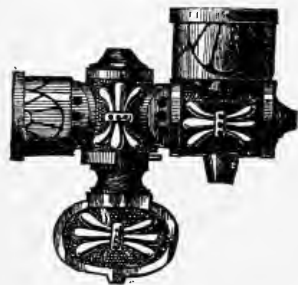
TWO-LIGHT PENDANT COCK.



TWO-LIGHT PENDANT COCK.

	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per doz. . .	9.10	9.10	9.10	8.45	8.45

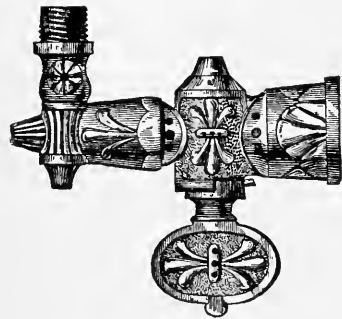
L PENDANT COCK.



L PENDANT COCK.

	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per doz. . .	5.20	5.20	5.20	4.90	4.90

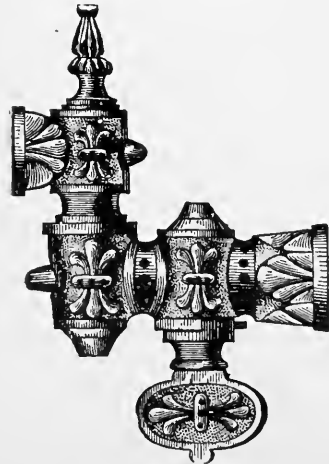
L BURNER COCK.



L BURNER COCK.

	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
Per doz. . . . .	6.20	5.20	4.55	4.25
$\frac{3}{8} \times 4\frac{1}{2}$ inches long,			$\frac{1}{4} \times 4\frac{1}{2}$ inches long,	
Per doz. 8.25			Per doz. 8.25	

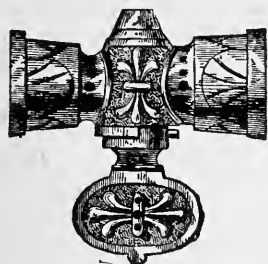
BRACKET COCK.



BRACKET COCK.

	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$
Per doz. . . . .	9.10	8.45	8.15
	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per doz. . . . .	8.15	7.80	7.80

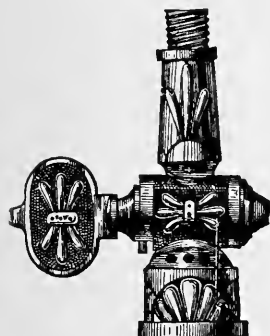
STRAIGHT OR STOP COCK.



STOP COCKS.

	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per doz.	\$4.90	4.55	4.55	4.55	4.25	3.90

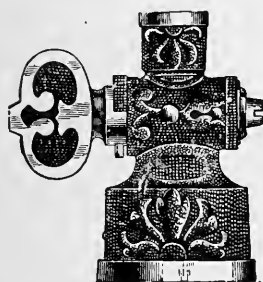
PILLAR COCK.



PILLAR COCKS.

	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{3}{8} \times 4$ in. long	$\frac{1}{4} \times 4$ in. long
Female, per doz.	\$6.50	5.20	4.55	4.25	3.90	7.15	7.15
Male,           "		6.25	5.55	5.20	4.90		

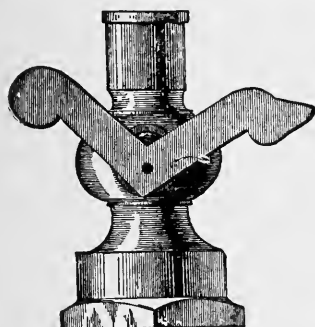
STREET LAMP COCK.



STREET LAMP COCK.

	1 to $\frac{1}{8}$	$\frac{3}{4}$ to $\frac{1}{8}$	$\frac{1}{2}$ to $\frac{1}{8}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per doz.	\$13.50	6.50	5.85	5.55	5.20	5.20

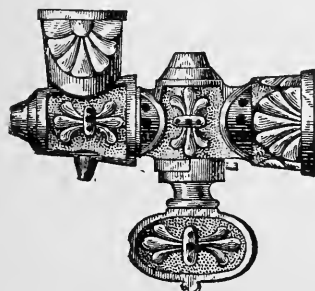
LEVER STREET LAMP COCK.



LEVER STREET LAMP COCK.

	1 to $\frac{1}{8}$	$\frac{3}{4}$ to $\frac{1}{8}$	$\frac{1}{2}$ to $\frac{1}{8}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per doz.	14.80	7.80	7.15	6.50	6.15	6.15

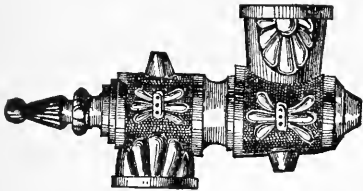
REVOLVING PENDANT COCK.



REVOLVING PENDANT COCKS.

	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per doz.	\$8.50	8.15	7.80	7.50	7.15	7.15

Top Swing.

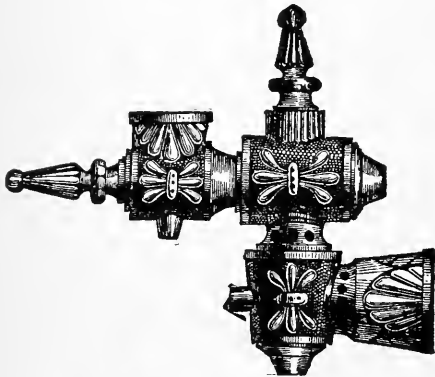


TOP SWINGS.

	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$
Per doz.....	\$6.20	5.55	5.20

MIDDLE SWINGS.

Universal Swing.

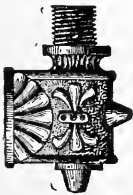


	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4} \times \frac{1}{8}$
Per Doz.....	4.25	4.90	4.55

UNIVERSAL SWINGS.

	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per Doz..	9.10	8.80	8.80	8.45	8 15	7.80

Side Nozzle.



SIDE NOZZLES.

	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{5}{16}$
Per Doz.....	2.30	1.65	1.00	1.00

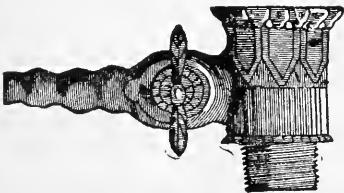
Straight Nozzle.



STRAIGHT NOZZLES.

	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{5}{16}$
Per Doz.....	1.00	1 65	1.95	1.00

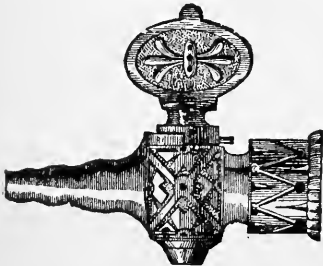
Independent Cock.



INDEPENDENT COCK, FOR RUBBER HOSE.

	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{3}{8}$ ex. h'vy.
Per Doz.....	6.50	6.00	5 50	8.00
For Patent Socket $\frac{3}{8}$ , Per Doz.....				6 50
Gas Stove Cock, $\frac{3}{8}$ , " ".....				6 75

Hose Cock.



HOSE COCKS.

	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
Per Doz. Female.....	5.25	4.90	4.55	4 25
Per Doz. Male.....	5.55	5.20	4.90	4.55

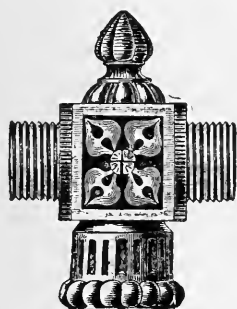
TWO-LIGHT BRACKET BODY.



TWO-LIGHT BRACKET BODY.

$\frac{3}{8}$  inch, Per Doz..... 5.00

TWO-LIGHT PILLAR BODY



TWO-LIGHT PILLAR BODY.

$\frac{3}{8}$ -inch, per dozen..... 5.20

BRASS CHANDELIER HOOKS,  
MALE OR FEMALE.

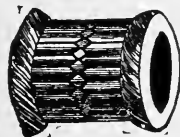


BRASS CHANDELIER HOOKS.

MALE OR FEMALE.

	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
Per doz.....	3.25	2.95	2.95	2.95

STIFF JOINTS.



STIFF JOINTS.

	$\frac{1}{2}$ to $\frac{1}{2}$	$\frac{1}{2}$ to $\frac{3}{8}$	$\frac{1}{2}$ to $\frac{1}{4}$	$\frac{1}{2}$ to $\frac{1}{8}$	$\frac{3}{8}$ to $\frac{3}{8}$
Per doz.....	3.25	2.60	2.60	2.60	1.95
	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per doz.....	1.85	1.55	1.50	1.40	1.40

LENGTHENING PIECE.



LENGTHENING PIECE.

$\frac{3}{8}$  to  $\frac{3}{8}$ , per doz..... 1.95

## EXTRA HEAVY BRASS GAS FIXTURE FITTINGS.

## TWO LIGHT PENDANT COCKS.

Size.....	$\frac{1}{2}$ to $\frac{3}{8}$	$\frac{1}{2}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$
Per dozen, \$	15.60	15.60	13.55	13.55	13.55	13.55	13.55

## L PENDANT COCKS.

Size.....	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$
Per dozen, \$	7.80	7.80	7.80	7.80	7.50

## L BURNER COCKS.

Size.....	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$
Per dozen.....	\$9.10	7.80	7.15

## BRACKET COCKS.

Size.....	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$
Per dozen.....	\$11.70	11.70	11.70

## STRAIGHT, OR STOP COCKS.

Size.....	$\frac{1}{2}$ to $\frac{1}{2}$	$\frac{1}{2}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$
Per dozen, \$	7.80	7.50	7.15	7.15	6.85	6.85

## PILLAR COCKS.

Size.....	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$
Per dozen.....	\$7.80	7.15	6.50	6.20

## REVOLVING PENDANT COCKS.

Size.....	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$
Per dozen, \$	10.40	10.40	10.40	10.40	10.40

## TOP SWINGS.

Size.....	$\frac{1}{2}$ to $\frac{1}{2}$	$\frac{1}{2}$ to $\frac{3}{8}$	$\frac{1}{2}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$
Per dozen, \$	10.40	10.40	10.40	9.45	8.45

## UNIVERSAL SWINGS.

Size.....	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{1}{4}$	$\frac{3}{8}$ to $\frac{1}{8}$	$\frac{1}{4}$ to $\frac{1}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$	$\frac{1}{8}$ to $\frac{1}{8}$
Per dozen, \$	14.00	13.00	13.00	12.35	12.35	12.05

## SIDE NOZZLES.

Size.....	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
Per dozen.....	\$2.60	2.20	1.95

## STRAIGHT NOZZLES.

Size.....	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{8}$
Per dozen.....	\$2.20	1.95	1.65

## INDEPENDENT COCKS.

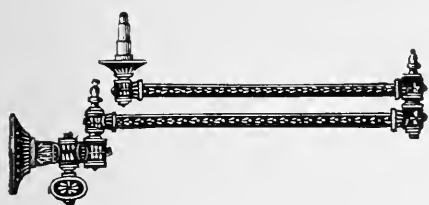
Size.....	$\frac{1}{2}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{3}{8}$ Lever Key.
Per dozen.....	\$11.50	9.10	10.50

## HOSE COCKS.

Size.....	$\frac{1}{2}$	$\frac{3}{8}$
Per dozen.....	\$7.50	7.00



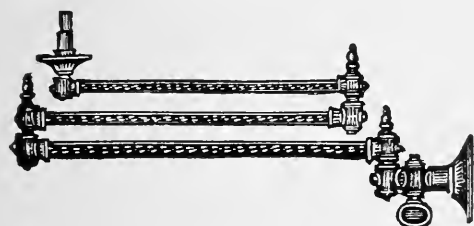
# GAS BRACKETS.



No. 102.



No. 106.



No. 104.



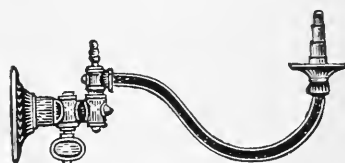
No. 100.



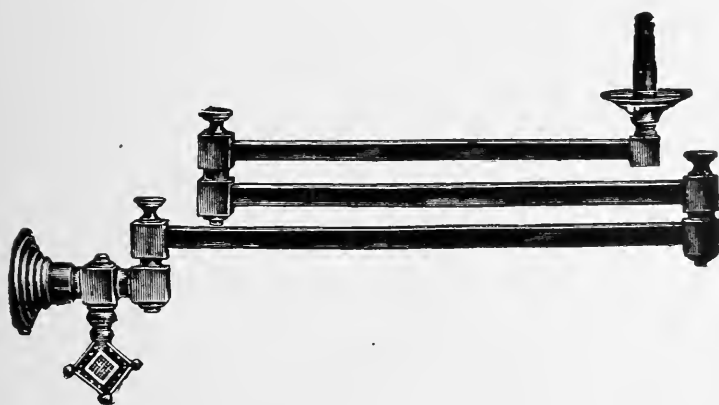
No. 809.



No. 109.



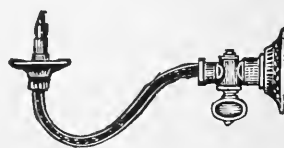
No. 111.



No. 810.



No. 113.



No. 112.

No. 100, Single Swing, $\frac{3}{8}$ -----	\$0.50
" 102, Double Swing, $\frac{7}{16}$ , $\frac{3}{8}$ -----	80
" 104, Three Swing, $\frac{7}{16}$ , $\frac{3}{8}$ , $\frac{5}{16}$ -----	1.15
" 106, Double Swing. Universal, $\frac{5}{16}$ , $\frac{3}{8}$	1.15
" 109, S Bend, $\frac{5}{16}$ -----	.55
" 111, C Bend, $\frac{5}{16}$ -----	50
" 112, C Bend, Stiff, $\frac{5}{16}$ -----	.40
" 113, Straight Bracket, Stiff, $\frac{3}{8}$ -----	.40

No. 809, Square Tube, Twist Center, Polished Brass or Bronze.	
Stiff, each-----	\$1 05
Single Swing, each-----	1.65
Double Swing, each-----	2.35
Three Swing, each-----	3.15
No. 810, Square Tube, Polished Brass or Bronze.	
Stiff, each-----	\$0.95
Single Swing, each-----	1 50
Double Swing, each-----	2.10
Three Swing, each-----	2 75

GAS BRACKETS, POLISHED.



Fig. 846.....Each, \$3.15

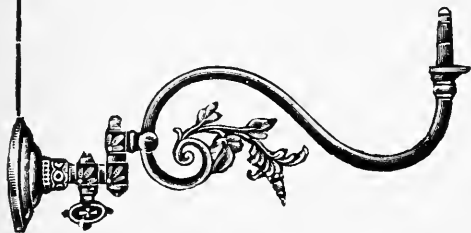


Fig. 847.....“ 2.40



Fig. 848.....“ 1.90

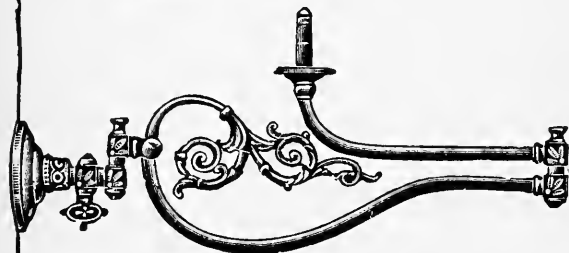


Fig. 849.....“ 3.50



Fig. 850.....“ 2.75



Fig. 851.....“ 4.25

No. 1726.

3 Lights.      Spread, 24 inches.      Length, 36 inches



No. 1726.

Two Light, without Globes, each.....	\$7.50
Three   “       “       “       “ .....	10.00
Four   “       “       “       “ .....	12.50

No. 1673.

3 Lights.      Spread, 18 inches.      Length, 30 inches.

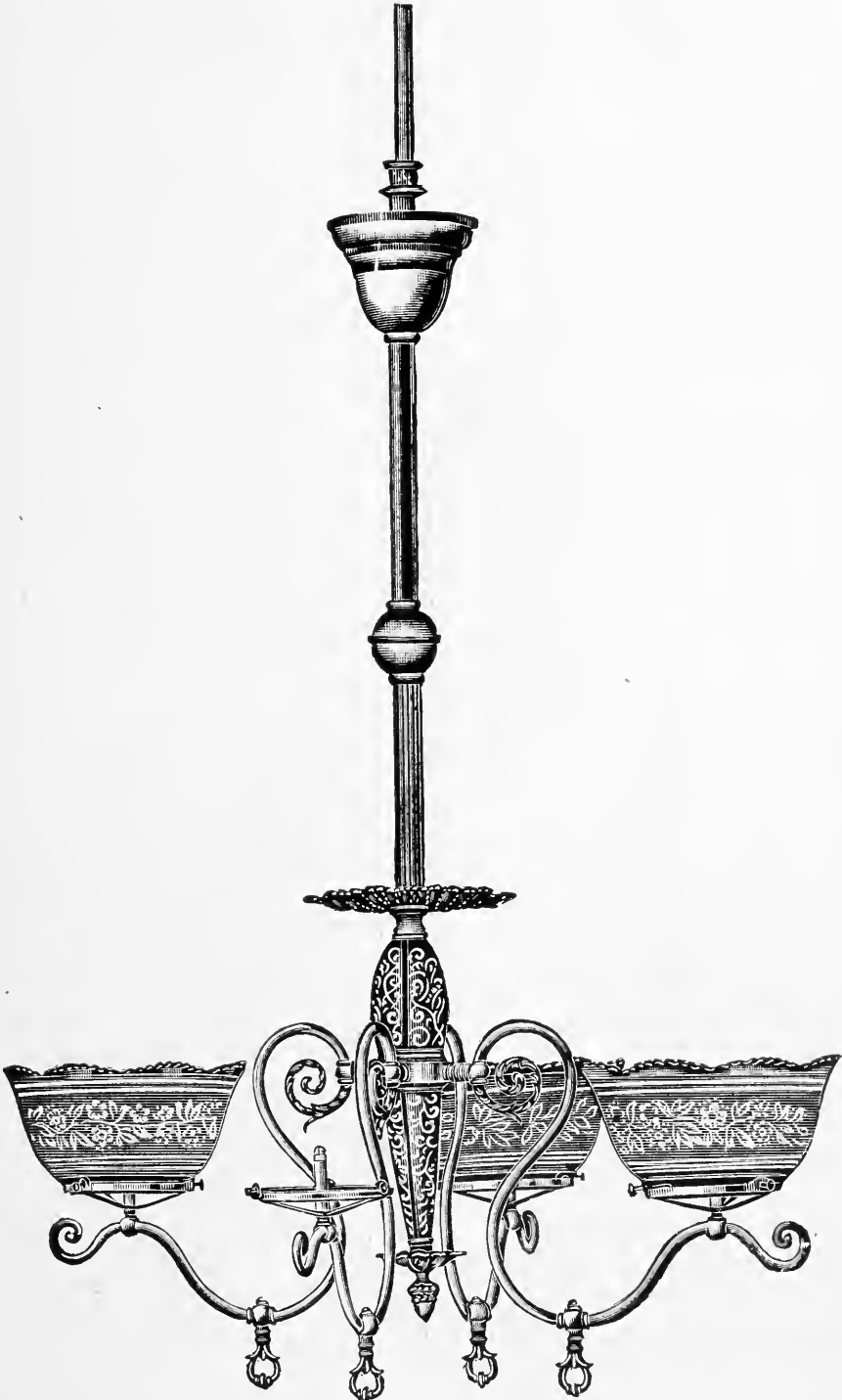


No. 1673.

Two	Light, without Globes, each	-----	\$5.00
Three	“ “ “ “	-----	6.65
Four	“ “ “ “	-----	8.30

No. 1703.

4 Lights.      Spread, 24 inches.      Length, 36 in hes.



No. 1703.

Two Light, without Globes, each.....	\$9.50
Three Light,   “       “       “ .....	12.25
Four Light,     “       “       “ .....	15 00

No. 1714.

3 Lights.      Spread, 20 inches      Length, 34 inches.



No. 1714.

Two Light, without Globes, each	-----	\$11.25
Three Light,      "      "	-----	15.00
Four Light,      "      "	-----	18.75

CLUSTERS.

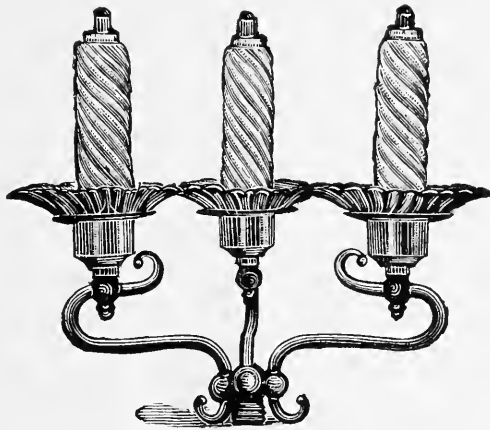


Fig. 784. Spread, 8 inches.  
3 Light. No Glass. Each, \$2.50. 4 Light. No Glass. Each, \$3.50.

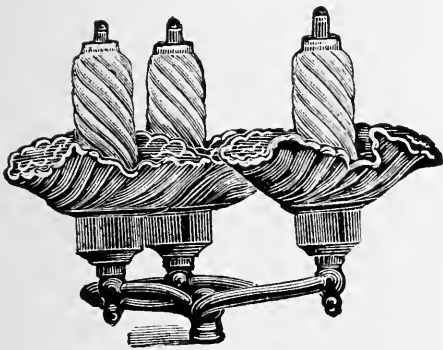


Fig. 775.  
Spread, 6 inches.  
No Glass. Each, \$2.00.

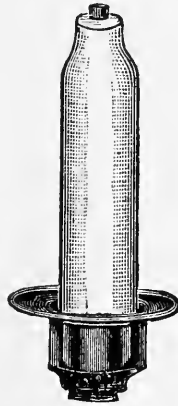


Fig. 780 1/2.  
Less Glass. Per doz., \$3.50.

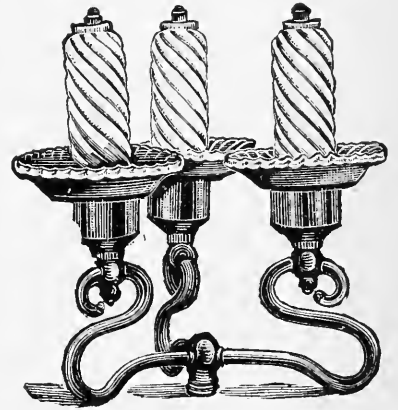


Fig. 778.  
Spread, 6 inches.  
No Glass. Each, \$2.50.

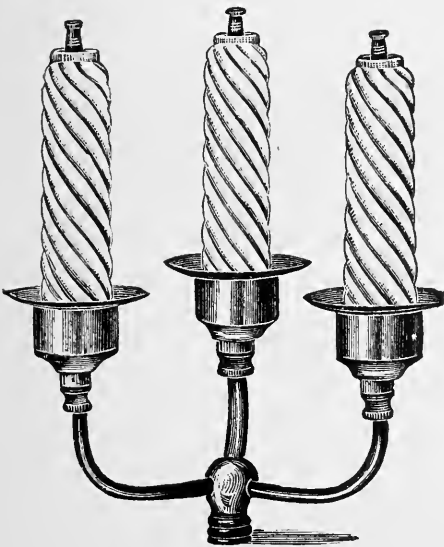


Fig. 779. Spread, 6 inches.  
2 Light. No Glass. Each, \$1.10.  
3 " " " 1.70.

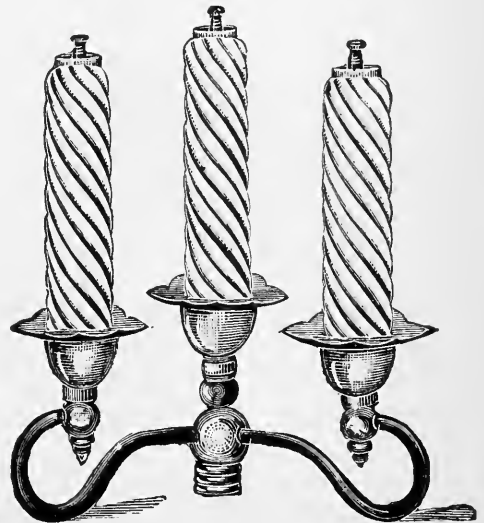


Fig. 780. Spread, 6 inches.  
2 Light. No Glass. Each, \$1.70.  
3 " " " 2.25.



PORTABLE STANDS.



Fig. 760.  
Brass. Height, 13 inches.  
Base, 5 inches.  
Each..... \$5.00



Fig. 704.  
Height, 12 inches.  
Base, 5 inches.  
Each..... \$1.80



Fig. 759.  
Brass. Height, 13 inches.  
Base, 5 inches.  
Each..... \$5.00

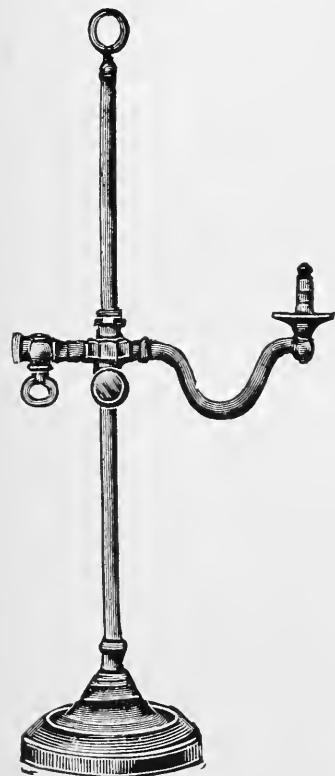


Fig. 761.  
Adjustable.  
Each..... \$6.60



Fig. 703.  
Height, 12½ inches.  
Base, 5 inches.  
Each..... \$2.50

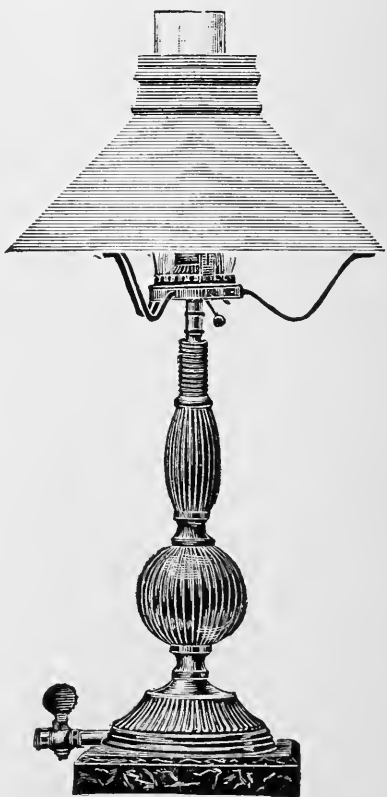
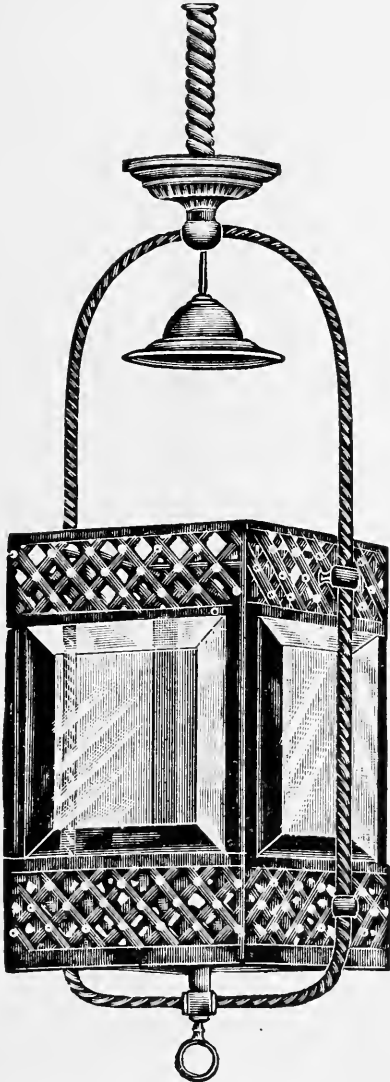


Fig. 714.  
Height, 13 inches.  
Base, 6 inches.  
Less trimmings, Each....\$6.00

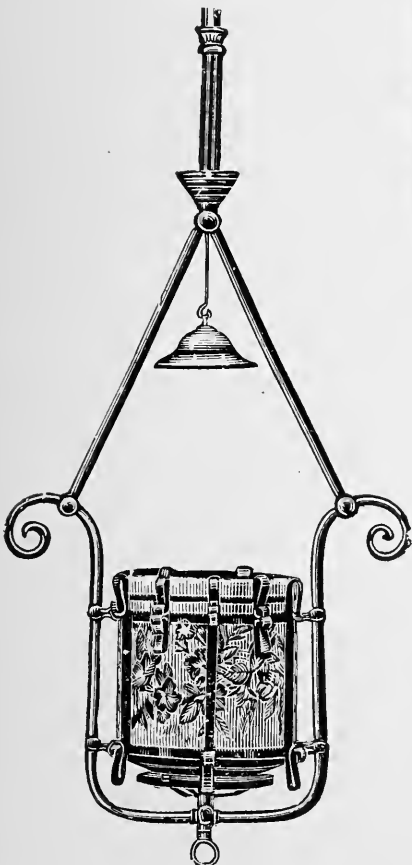
HALL LIGHTS.

Fig. 575.



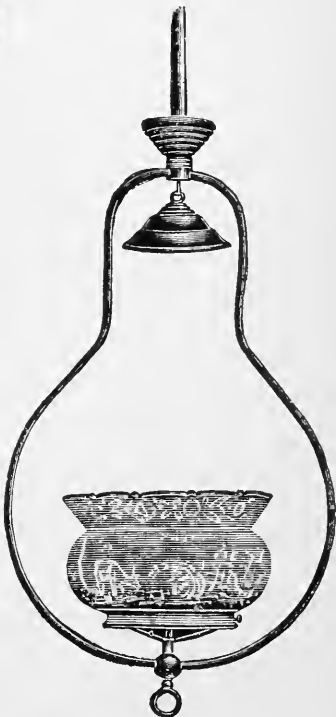
Complete, each..... 11.00

Fig. 534.



Cylinder 7x8x5 inches.  
Complete, each..... 10.50

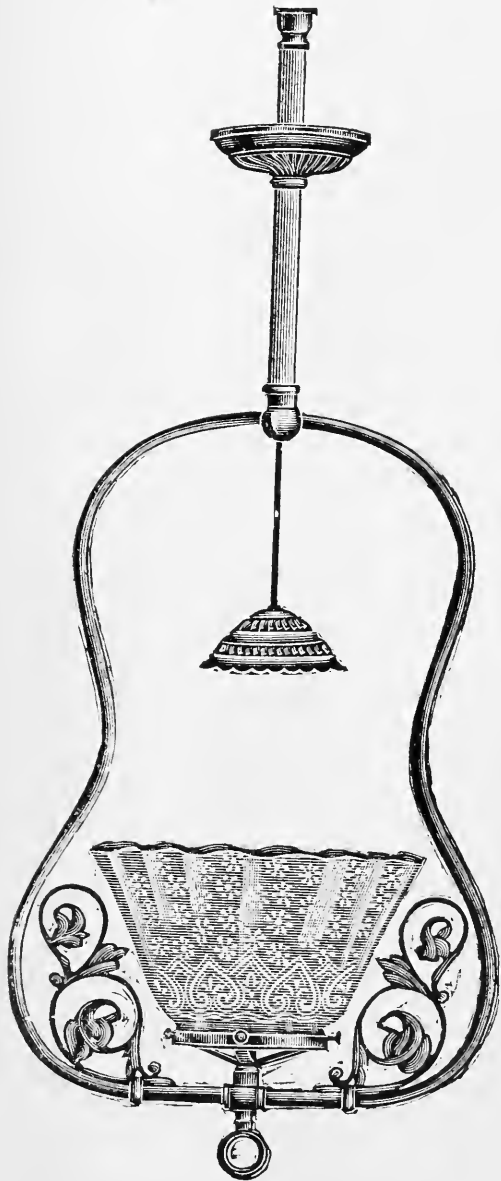
Fig. 515.



Complete, each..... 3.00  
Less Glass, each..... 2.30

HALL LIGHTS.

Fig. 587.



Complete, each.....\$4.00  
Less Glass..... 3.10

Fig. 595.



Length, 30 inches.    Globe, 10 inches.  
1 Light Gas, each.....\$15.00  
2    "    "    and Electric, each.. 21.00

GAS BURNERS AND TIPS.



IRON BURNERS,  
Fig. 28,  
Bat Wing.  
Doz. \$ .60  
Gro. 6.00



Fig. 29,  
Fish Tail.  
Doz. .60  
Gro. 6.00



Fig. 14,  
Brass, Lava Tip  
Burner.  
Doz. .40 Gro. 4.00

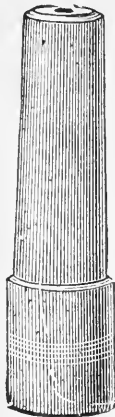
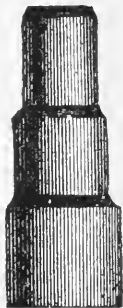


Fig. 13,  
Common Brass Burner  
with Gauge Screen.  
Doz. .50 Gro. 4.50



Brass Pillars  
for Lava or  
Scotch Tips.

Fig. 20.  
Doz. .20  
Gro. 2.00



Fig. 33.  
Lava Tip.  
Gro. \$2.00



Fig. 395.  
Brass Adamas,  
Taper Tip. Gro. 4.00



Fig. 398.  
Fish Tail, Iron.  
Gro. 2.50

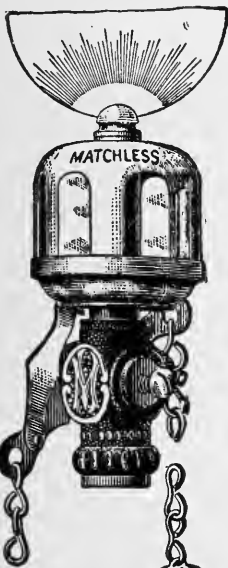


Fig. 396.  
Lava Adamas,  
Taper Tip, F. T. Gro. 4.50



Fig. 399.  
Bat Wing—Iron.  
Gro. 2.50

BRAY'S GAS BURNERS.



GAS ON.  
"Matchless" Self Lighting  
Burner, each.....75 cents.

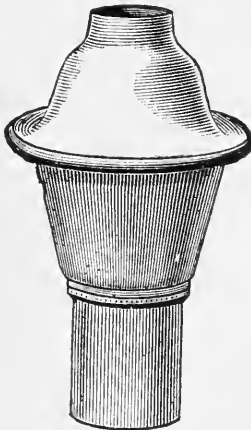


Figure 19.

EMPIRE BURNER WITH LAVA TIP.

This burner has an adjustable screw check inside and can be set to burn any amount of Gas, at the pleasure of the consumer.

Per dozen.....\$1.00  
Per gross.....9.00



Adjustable Union-Jet,  
Gross, \$14.00



Slit-Union,  
Gro., \$14.00



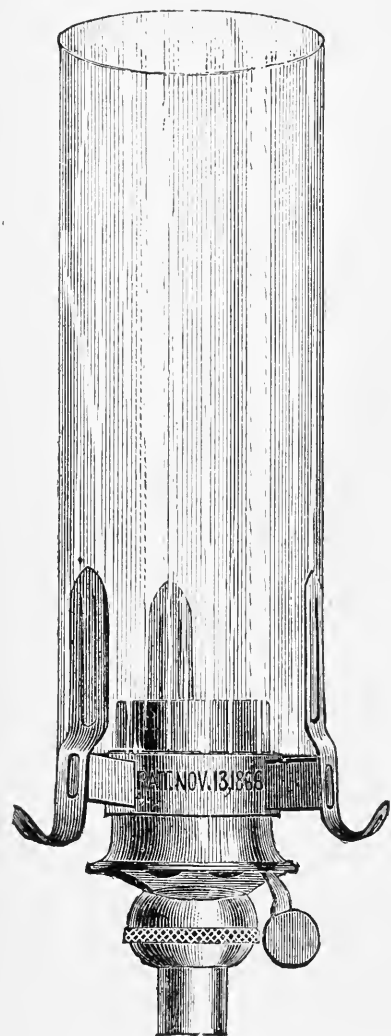
Union-Jet.  
Gross, \$14.00



Regulator.  
Gross, \$7.00

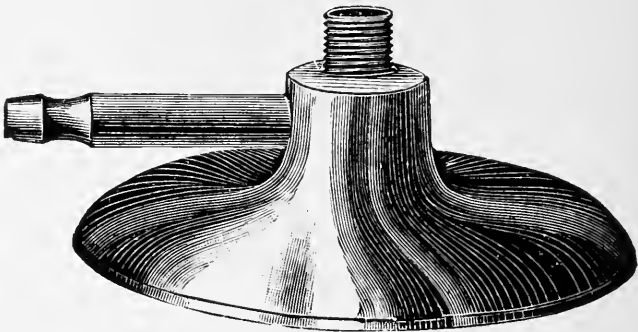
NOISELESS ARGAND  
BURNER.

WITH GRECIAN HOLDER.



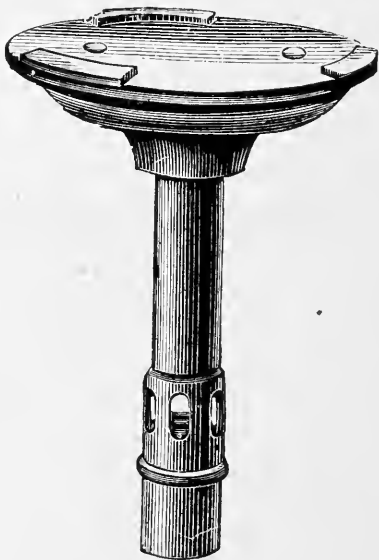
Per dozen.....	\$6.00
Per gross.....	60.00
6 or 7 inch chimneys, per doz.....	.80
Welsbach chimneys, ground, 8 in., per doz.	1.80

MONITOR OR NOVELTY  
STAND.



No. 1, per doz.....	\$3.00
" 2, " .....	6.00
" 3, " .....	9.00

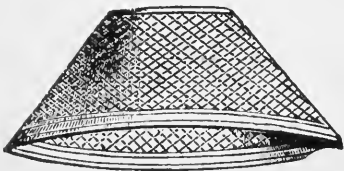
MONITOR HEATING BURNER.



No. 1, Brass Stem, per doz.....	\$3.00
" 2, Iron " .....	8.00
" 3, " " .....	10.00

FANCY RING OR GLOBE HOLDERS.

4 inches, per gross.....	\$13.00	Per dozen.....	\$1.25
5 inches, " .....	15.00	.....	1.40



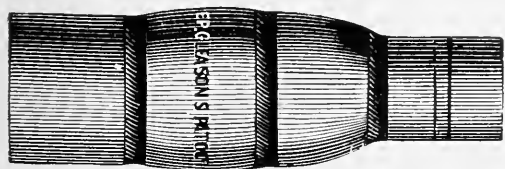
TIN GAS SHADES.

WITH HOLDER.

10 inch, per dozen.....	\$3.50
11 and 12 inch, per dozen.....	4.00
Holders for same to slip over common burners, per dozen.....	1.40

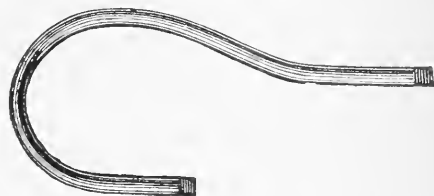
## GAS APPLIANCES.

### DROP LIGHT SOCKET.



$\frac{5}{16}$  and  $\frac{3}{8}$  for Brass or Iron Burner.  
Per doz.....\$2.00      Per gross....\$20.00

### GOOSE NECK FOR PORTABLE STAND.

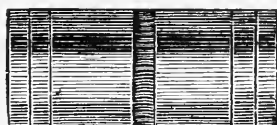


Per doz ..... \$2.50

### MOHAIR TUBING.

Lengths, 6, 8, 10, 12 feet..... Per foot, 16 cents

### UNIONS FOR CONNECTING MOHAIR TUBING.



Per doz ..... \$1.50

### GAS STOVE TUBING, TAN ENDS.

$\frac{1}{4}$ -inch, per foot.....	.10
$\frac{5}{16}$ -inch, ".....	.12
$\frac{3}{8}$ -inch, ".....	.14
Patent Ends, $\frac{3}{8}$ -inch, per foot.....	.16

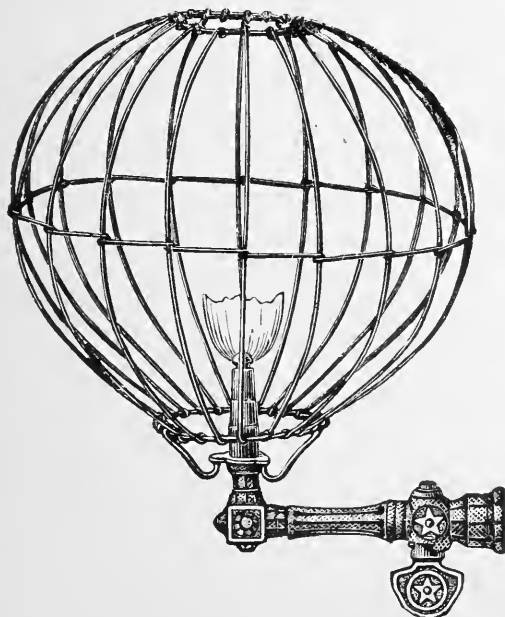
### TAPER SLIDE AND KEY, AND PLAIN GAS KEY.



Nickel Plated.....	Per doz.,	\$8.00
Brass.....	"	10.00
Plain Gas Key.....	"	6.00

### WAX TAPERS.

Per dozen boxes, 30 Tapers in each.....	1.50
" " " 60 " ".....	3.00



### WIRE GLOBE.

7 inch diameter..... Per doz., \$6.00

HOSE.

Internal Diam. Inches.....	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	4
2-Ply for light pressure, per ft.	.20	.25	.33	.42	.50	.58	.66	.75	.83	.92	1.00	1.32
3-Ply test 60 lb. sq. in., " "	.25	.30	.40	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.60
4-Ply " 90 " " " " "	.30	.37	.50	.62	.75	.87	1.00	1.12	1.25	1.37	1.50	2.00

5, 6 and other Ply Hose made at a proportionate advance over 4-Ply, thus 5-Ply is 25 per cent. more than 4-Ply ; 6-Ply 50 per cent. more, and so on.

EXTRA FOR ARMORING HOSE. (Net.)

Size of Hose. Inches.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/4	2 1/2	3	4
Light wire, coarse coil, per ft.	.03	.03	.05	--	--	--	--	--	--	--
Heavy wire, fine coil, " "	.04	.04	.06	.09	.10	.13	.15	.18	.26	.40
For steam and high pressure, per ft.,--	.08	.09	.10	.12	.14	.18	.21	.24	.38	.60

EXTRA (BREWERS', STEAM, AIR BRAKE, &c.) HOSE.

Internal Diam. Inches..	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	
3-Ply, per ft.	.43	.51	.67	.85	1.02	1.18	1.34	1.50	1.66	
4-Ply, " "	.51	.67	.83	1.04	1.25	1.45	1.66	1.87	2.80	
5-Ply, " "	.64	.84	1.04	1.30	1.57	1.79	2.08	2.34	2.60	

SUCTION HOSE.

Internal Diam. In.	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Spiral Coil, per ft.	.90	1.15	1.50	2.30	3.10	4.00	4.90	5.80	7.60	9.50	15.00	20.00	25.00
Smooth bore, " "	--	--	--	2.60	3.50	4.50	5.50	6.50	8.50	10.50	16.50	22.50	27.50
Hard rubber, " "	.75	.93	1.15	1.50	1.88	--	--	--	--	--	--	--	--

RUBBER TUBING.

Internal Diam. Inches.....	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
Plain rubber, per ft.	.08	.12	.16	.18	.20	.25	.30	.35	.45
Cloth insertion, " "	.10	.14	.18	.20	.23	.28	.33	.38	.50

WOVEN LINEN HOSE, SEAMLESS, BEST QUALITY.

Internal Diam. In.	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	4	5	6	8	10	12
Plain, per ft.	.12	.15	.18	.20	.22	.24	.26	.28	.34	.40	.55	.70	.85	1.20	1.40	1.70
Rubber Lined, per ft.	.20	.30	.45	.50	.52	.55	.65	.70	.75	.85	--	--	--	--	--	--
Paraphined, " "	.15	.19	.23	.25	.27	.30	.33	.35	.37	.41	--	--	--	--	--	--
Extra Heavy Rubber Lined, per ft.	--	.75	.83	.90	1.00	1.10	1.30	1.50	--	--	--	--	--	--	--	--

Made in lengths up to 1,000 feet, plain or paraffined. Rubber Lined, Extra, etc., made in 50 feet lengths only.

SEAMLESS COTTON HOSE, RUBBER LINED.

Internal Diam. Inches.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
Single, per foot	.25	.30	.40	.45	.50	.60	.70
Jacket, " "	--	--	--	--	1.00	1.25	1.50

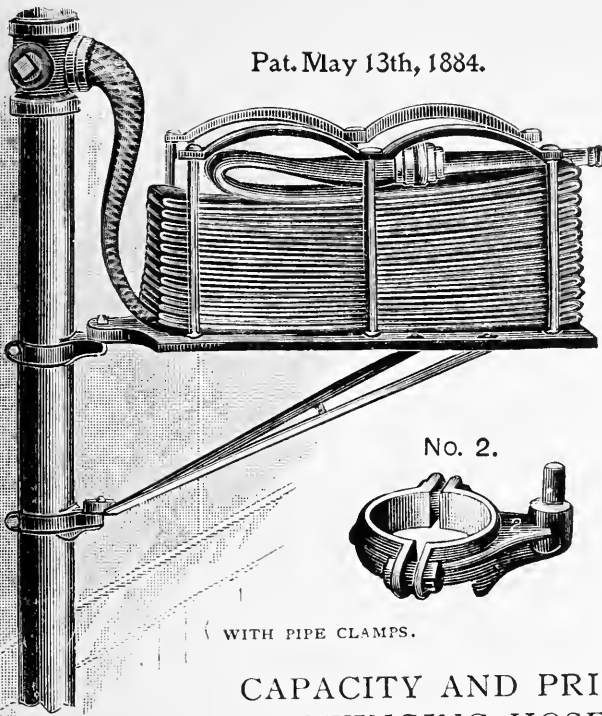
NUMBER OF PLIES TO ORDER IN STEAM HOSE,

Size of Hose and Steam Pressure being given.

20 lbs. Pressure.	30 lbs. Pressure.	40 lbs. Pressure.	50 lbs. Pressure.	60 lbs. Pressure.
ORDER. 4-Ply for 1/2 4- " 3/4 4- " 1 4- " 1 1/4 4- " 1 1/2 4- " 2	ORDER. 4-Ply for 1/2 4- " 3/4 4- " 1 4- " 1 1/4 4- " 1 1/2 5- " 2	ORDER. 4-Ply for 1/2 4- " 3/4 4- " 1 4- " 1 1/4 5- " 1 1/2 6- " 2	ORDER. 4-Ply for 1/2 4- " 3/4 5- " 1 5- " 1 1/4 5- " 1 1/2 8- " 2	ORDER. 4-Ply for 1/2 5- " 3/4 6- " 1 6- " 1 1/4 6- " 1 1/2 8- " 2
70 lbs. Pressure.	80 lbs. Pressure.	90 lbs. Pressure.	100 lbs. Pressure.	
ORDER. 5-Ply for 1/2 6- " 3/4 7- " 1 7- " 1 1/4	ORDER. 6-Ply for 1/2 6- " 3/4 8- " 1 8- " 1 1/4	ORDER. 6-Ply for 1/2 6- " 3/4 8- " 1	ORDER. 8-Ply for 1/2 8- " 3/4 10- " 1	



Pat. May 13th, 1884.



SWINGING HOSE RACKS,  
WITH PIPE CLAMPS,  
OR  
WITH WALL PLATES.

CAPACITY AND PRICE LIST OF  
SWINGING HOSE RACKS.

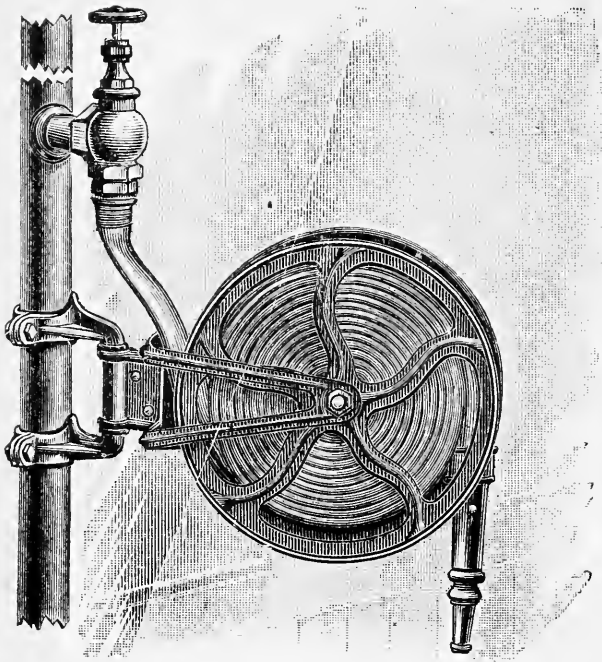
Aluminum finish or any color enamel.

No.						With Wall Plate.	With Pipe Clamp.
X 1	for	25 ft.	Unlined Linen Hose	-----	I	\$5 00	\$5 40
X 2	for	50	" "	-----	I	5 00	5 40
X 3	for	75	" "	-----	I	5 50	5 90
X 4	for	100	" "	-----	I	6 00	6 40
o	Narrow,	for	50	" "	-----	1 1/2	5 00
o		for	50	" "	-----	2	5 00
oo		for	50	" "	-----	2 1/2	5 00
1	Special Narrow,	for	75	" "	-----	1 1/2	5 50
1	"	for	75	" "	-----	2	5 50
2	"	for	75	" "	-----	2 1/2	5 50
1	Narrow,	for	100	" "	-----	1 1/2	6 00
1		for	100	" "	-----	2	6 00
2		for	100	" "	-----	2 1/2	6 00
3	Special Narrow,	for	125	" "	-----	1 1/2	6 50
3	"	for	125	" "	-----	2	6 50
4	"	for	125	" "	-----	2 1/2	6 50
3	Narrow,	for	150	" "	-----	1 1/2	7 00
3		for	150	" "	-----	2	7 00
4		for	150	" "	-----	2 1/2	7 00
5	Narrow,	for	200	" "	-----	1 1/2	7 50
5		for	200	" "	-----	2	7 50
6		for	200	" "	-----	2 1/2	8 00
3	Narrow,	for	50 ft. Rubber-lined Cotton Mill Hose,	-----	1 1/2	7 00	7 40
3		for	50	" "	-----	2	7 00
4		for	50	" "	-----	2 1/2	7 00
5	Narrow,	for	100	" "	-----	1 1/2	7 50
5		for	100	" "	-----	2	7 50
6		for	100	" "	-----	2 1/2	8 00

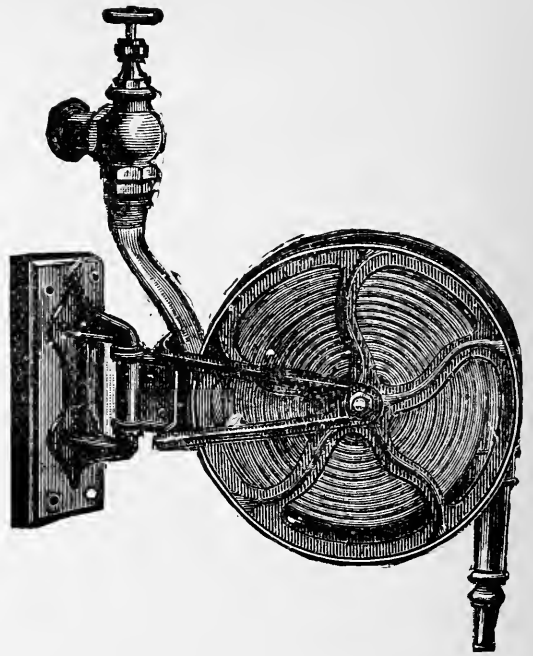
In ordering racks with pipe clamps always state internal diameter or external circumference of pipe to which racks are to be attached.

Racks nickel plated on iron are \$3.00 each, net, more than above.

Special quotations for other styles of finish furnished on application.



WITH PIPE CLAMPS.



WITH WALL PLATE.

### CAPACITY AND PRICE LIST OF A B C SWINGING REELS.

Aluminum finish or any color enamel, with wall plates.

A 1	for	50 ft. Unlined Linen Hose	1 1/2	\$5 00
A 2	for	50 " "	2	5 00
A 3	for	50 " "	2 1/2	5 00
AA 1	for	75 " "	1 1/2	5 50
AA 2	for	75 " "	2	5 50
AA 3	for	75 " "	2 1/2	5 50
B 1	for	100 " "	1 1/2	6 00
B 2	for	100 " "	2	6 00
B 3	for	100 " "	2 1/2	6 00
C 1	for	150 " "	1 1/2	7 00
C 2	for	150 " "	2	7 00
C 3	for	150 " "	2 1/2	7 00
D 1	for	200 " "	1 1/2	8 00
D 2	for	200 " "	2	8 00
D 3	for	200 " "	2 1/2	8 00
C 1	for	50 ft. Rubber-lined Cotton Mill Hose	1 1/2	7 00
C 2	for	50 " " "	2	7 00
C 3	for	50 " " "	2 1/2	7 00
D 1	for	100 " " "	1 1/2	8 00
D 2	for	100 " " "	2	8 00
D 3	for	100 " " "	2 1/2	8 00

Above reels with pipe clamps are 40c. each, net, in addition to net cost of above.

# HOSE PIPES.

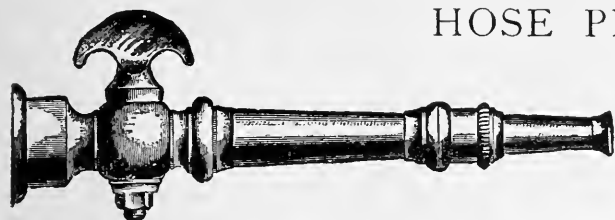


Fig. 601.

COCK ON LARGE END.

Size Coupling, inches,	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1	1	1	$1\frac{1}{4}$	$1\frac{1}{4}$
Length, inches,.....	6	8	9	12	8	9	12	12	15
Fig. 601, per dozen...	11.00	13.00	18.00	18.00	15.00	20.00	20.00	40.00	45.00

Size Coupling, inches,	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$
Length, inches,.....	20	12	15	20	12	20	15	24
Fig. 601, per dozen..	55.00	55.00	60.00	80.00	80.00	110.00	150.00	200.00

Fig. 603.

WITH SCREW TIP.



Size Coupling, inches,	$\frac{3}{4}$	$\frac{3}{4}$	1	1	$1\frac{1}{4}$	$1\frac{1}{4}$
Length, inches,.....	8	12	8	12	12	15
Fig. 603, per dozen..	8.00	10.00	10.00	12.00	20.00	24.00

Size Coupling, inches,	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	$2\frac{1}{2}$
Length, inches,.....	20	12	15	20	12	20	15
Fig. 603, per dozen..	30.00	25.00	30.00	36.00	38.00	50.00	75.00



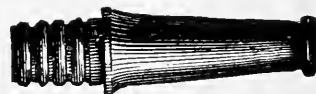
Fig. 604.

WITHOUT TIP.

Size Coupling, inches,	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Length, inches,....	8	8	12	12	12	15
Fig. 604, per dozen..	7.00	9.00	18.00	22.00	34.00	65.00

Fig. 608. HOSE NOZZLE TO TIE ON.

Size, inches,.....	$\frac{1}{2}$	$\frac{3}{4}$	1
Entire Length, inches,	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$
Per dozen,.....	3.00	3.50	4.00



# HOSE PIPE TIP.

To fit  $\frac{3}{4}$  and 1 inch pipes,.....per dozen, 4.00

# HOSE SPRINKLERS.



Size,.....	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Per dozen,	3.50	4.50	6.00	9.00	12.00	18.00

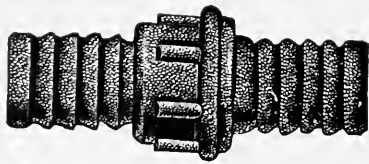
# HOSFORD'S PAT. HOSE PIPE.

Fig. 606½

Size Coupling, inches,.....	$\frac{3}{4}$	1
Finished, per dozen,.....	15.00	18.00
Nickel Plated, per dozen,.....	17.00	20.00



Fig. 606½.



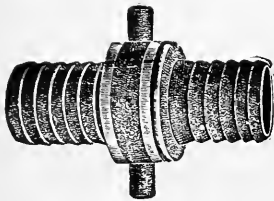
Without Lugs.



With Lugs.

Sizes .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{4}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Per doz.....	2.40	2.40	4.40	10.00	14.00	24.00	30.00	48.00	.....	.....
For Iron Pipe, per doz.....	2.65	2.65	4.65	10.50	15.00	26.00	32.00	50.00	76.00	120.00

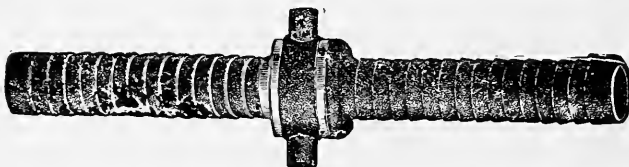
### SUCTION HOSE COUPLINGS.



Sizes.....	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$
Each.....	4.00	5.25	7.50	9.50	12.50	16.00
Sizes.....	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	7	8
Each.....	20.00	24.00	28.00	40.00	54.00	80.00

### STEAM HOSE COUPLING.

STEAM METAL.



Sizes .....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Iron Pipe Thread, each.....	1.25	1.25	1.50	2.00	2.50	3.50	6.00

Either part of Coupling two-thirds list price. Couplings  $\frac{1}{2}$  to  $2\frac{1}{2}$  furnished cut to standard Hose Gauge. Above  $2\frac{1}{2}$  cut to Iron Pipe Thread, unless ordered otherwise.

### THE CALDWELL PATENT HOSE STRAP.

Clamps will always be sent for three-ply Hose, unless otherwise ordered



No.....	2	4	6	8	10	12	14	16	18
Inch,.....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	1	1	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{2}$
Inch long,	$3\frac{3}{8}$	$3\frac{3}{4}$	$4\frac{1}{8}$	$4\frac{3}{4}$	5	$5\frac{3}{8}$	6	$6\frac{3}{8}$	$6\frac{3}{4}$
Per dozen, \$	0.40	.40	.60	.60	.80	.80	1.00	1.00	1.20

No.....	20	22	24	26	28	30	32	34	36
Inch,....	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{3}{4}$	2	2	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{1}{2}$
Inch long,	$7\frac{1}{8}$	$7\frac{1}{2}$	8	$8\frac{1}{2}$	9	$9\frac{1}{2}$	10	$10\frac{1}{2}$	11
Per dozen, \$	1.20	1.40	1.40	1.60	1.60	1.80	1.80	2.00	2.00

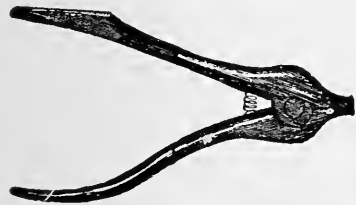


HOSE SPLICE.—FOR MENDING HOSE.

Size.....	in.	1/2,	3/4,	1,
Brass.....	per doz.	\$1.20	1.20	2.00
Coppered .....	"	.40	.50	1.00

HOSE CLAMP.

Size for 3-ply Hose.in.	1/2,	3/4,	1,	1 1/4,	1 1/2,	2,	2 1/2,	3,
Per doz.....	\$1.50	1.50	2.00	2.50	3.00	4.00	7.00	10.00

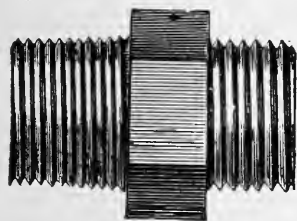


HOSE STRAP FASTENER.

1/2 to 1 inch.....	\$ .50
1 1/2 to 2 1/2 inch.....	.75

HOSE NIPPLE.

Size .....	1/2	3/4	1	1 1/4	1 1/2
Per doz..	\$3.50	3.50	5.00	9.00	10.00
Size .....	2	2 1/2	3	3 1/2	4
Per doz..	14.00	28.00	40.00	50.00	75.00



Hose Nipple.

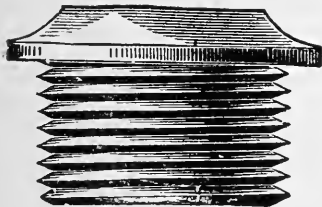


Hose Reducer.

HOSE REDUCER.

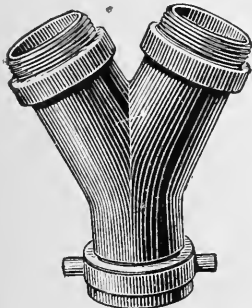
Size.....	1x3/4	1 1/4x1	1 1/2x1 1/4	2x1 1/2
Per doz. ....	\$6.50	10.00	12.00	18.00

HOSE BIBB ENDS.



Size.....	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2
Price, per doz....	\$2.50	2.50	2.50	2.50	3.50	6.00	8.00	15.00

SIAMESE COUPLINGS.



Siamese Coupling.

With two 2 1/2 inch Male Outlets, and 2 1/2 inch Female Inlet, with loose coupling on Inlet.....	\$10.00
With two 2 1/2 inch Male Outlets, and 4-inch Female Inlet, with loose coupling on Inlet.....	14.00



PLUMBERS', STEAM AND GAS FITTERS' TOOLS—Continued.

SCREW DRIVERS.



Sizes, inch,	3,	4,	5,	6,
Per dozen,	\$2.00	2.00	3.00	3.50
Sizes, inch,	7,	8,	9,	10,
Per dozen,	\$4.00	4.60	5.25	6.25

CHIPPING KNIFE.



4½, 5, 6 inch,.....per doz. \$7.00

MALLETS.



Size, inch,..	2½,	3,	3½,
Hickory,....	\$5.50	7.00	8.00
Lignumvitæ,	7.50	10.00	12.00

TURN PIN.



Boxwood, No. 1, 2, 3,.....per doz. \$3.00  
Dogwood or Hickory, No. 1, 2, 3. " 1.75

DRESSER.



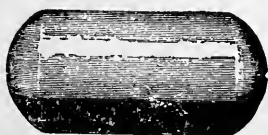
Hickory Wood, per doz..... \$8.00  
Boxwood, " ..... 10.00

BOSSING STICK.



Boxwood,.....per doz, \$10.00  
Dogwood or Hickory,..... " 8.00

DRIFT PLUG.



Size, 1, 1¼, 1½, 2 inch,.....per doz. \$2.00

STEEL FACE PLANE.



Each,.....\$0.75

ROUND IRON.



Nos. ....	1,	2	3,
Per dozen, ..	\$8.00	11.00	13.00

POCKET SPIRIT LEVEL.



Iron, per dozen,.....\$2.50  
Brass Top, per dozen, ..... 3.00

FANCY CALIPERS.



Per dozen,.....\$3.50

CALIPERS.



Size, in. . .	2½,	3,	4,	5,	6,
Per dozen, \$	\$3.00	3.00	3.25	3.75	4.25

SINGLE EDGE SAW.



Size, inches,	12,	14,	16,	18,
Per dozen, ..	\$7.70	8.75	9.75	11.00

DOUBLE EDGE SAW.



Size, inches,	12,	14,	16,	18,
Per dozen, ..	\$8.75	9.75	11.00	12.00

COMPASS SAW.



Size, ins.	8,	10,	12,	14,	16,	18,
Per doz. .	\$4.00	4.25	4.25	4.75	5.00	5.25



PLUMBERS', STEAM AND GAS FITTERS' TOOLS—Continued.

LADLE.



Single or Double Lip, forged of Best Charcoal Iron, Extra Heavy.

Inches,	2½,	3,	3½,	4,
Per doz.	\$3.75	4.65	5.50	6.50
Inches,	5,	6,	7,	8,
Per doz.	\$8.75	10.00	24.00	30.00

RASP.



Size, inches,	10,	12,	14,
Each,.....	\$0.40	.60	.80

STEEL PLIERS.



5 in. per doz. \$6.00    6 in. \$7.00    7 in. \$8.00

CUTTING NIPPERS.—Extra Heavy.



With Set Screw.

Inches, .	7,	8,	9,	10,	12,	14,
Per pair,	\$2.50	2.88	3.25	3.60	4.25	5.00

SINGLE JOINT CUTTING NIPPERS.



All Steel.

Inches, .	8,	10,	12,
Per pair	\$2.50	3.00	3.50

CUTTING NIPPERS.—Extra Quality.



Inches, .	5,	6,	7,	8,
Per doz.	\$15.00	20.00	24.00	30.00

CUTTING PLIERS.



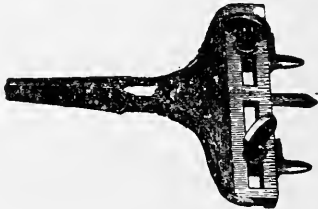
Size, in.	4,	4½,	5,	5½,	6,	7,
Per doz.	\$5.60	5.60	5.60	6.25	6.75	7.50

WASHER CUTTER.



Black Handle,..... per doz. \$10.00

WASHER CUTTER.



Per dozen,.....\$15.00

PATENT DOUBLE WASHER CUTTER.



To cut Washers up to 1½ diameter.

Each,.... \$2.75

COMPASSES.



Inches, .	5.	6.	7,	8,
Per doz.	\$3.50	4.00	4.75	5.50

CANDLESTICK.



Per dozen,.....\$3.00

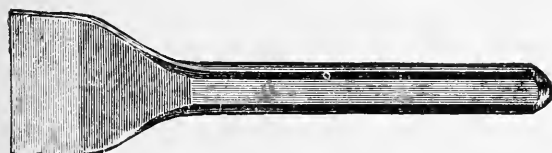
SIDE EDGE.



Best,..... per dozen, \$8.50  
Dogwood or Hickory,.... " 5.00

PLUMBERS', STEAM AND GAS FITTERS' TOOLS.—Continued.

FLOOR CHISEL —Octagon.



Per dozen.....\$22.00  
Length, 16 inches. Width of Blade, 4 inches.

FLOOR CHISEL.—Round.



Per doz....15 inch, \$22.00. 18 inch, \$24.00  
Width of Blade, 3 inches.

WOOD CHISEL.



Large, 2 in. Blade....14 inch, per doz. \$11.50  
Small, 1 " " ....10½ " " 6.00

COLD CHISEL.



Inches.. 6 8 10 12 16 20  
Per doz. \$5.00 6.00 7.25 7.50 11.00 27.00

ROUND NOSE CHISEL.



Per dozen.....\$6.00

HALF-ROUND NOSE CHISEL.



Per dozen.....\$6.00

CAPE CHISEL.



Per dozen.....\$6.00

DIAMOND NOSE CHISEL.



Per dozen.....\$6.00

FIRMER CHISEL.



Size, inches, 1 1½ 2  
Per dozen.. \$12.00 14.00 16.00

FIRMER GOUGE.



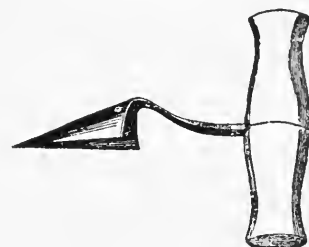
Size, inches, 1 1½ 2  
Per dozen.. \$9 50 11.50 13.00

TAP BORER.



Philadelphia Pattern. Extra Heavy Shank.  
Per dozen .....\$5.00

TAP BORER.



New York Pattern, Extra Heavy Shank.  
Per dozen .....\$5.00

BASIN WRENCH.



Buzzell's Patent.  
Each .....\$1.25

BASIN WRENCH.



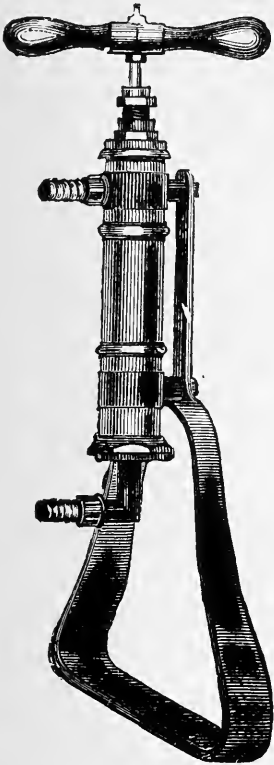
Common, per dozen.....\$7.50

BENDING PIN.

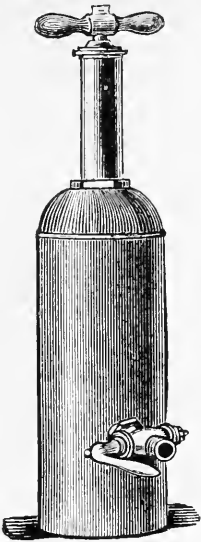


Per dozen.....\$3.50  
One End Straight, per dozen.....3.50





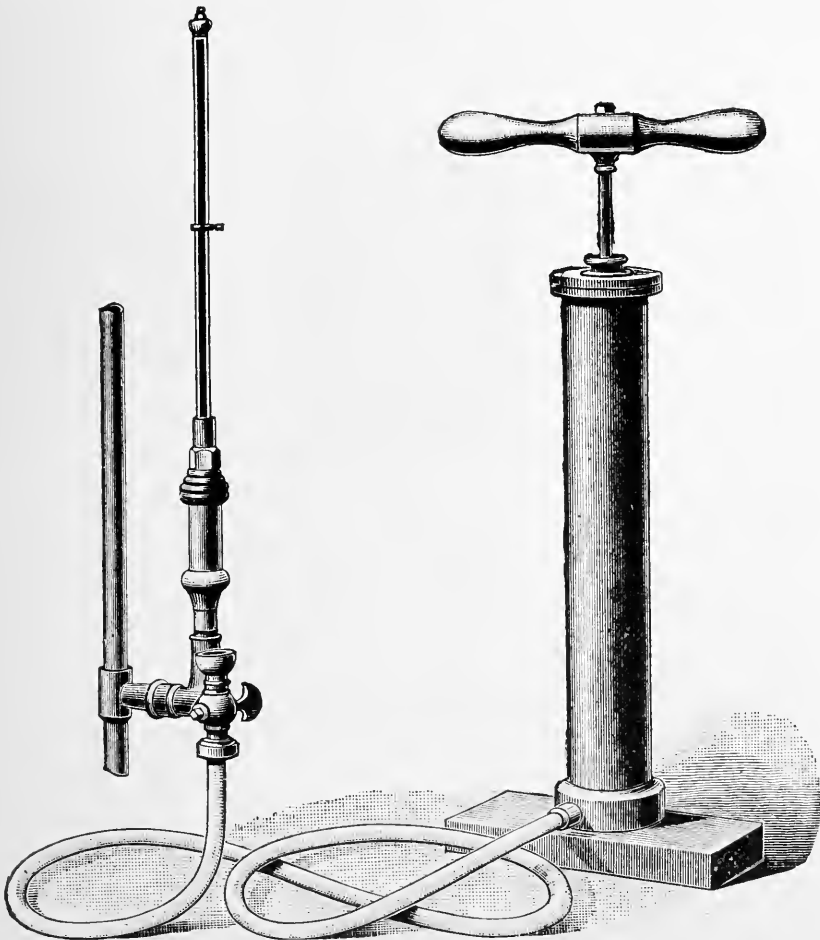
Force Pump,  
with Stirrup.  
Each..... \$15.00



Gas Main or Clearing  
Pump,  
Complete with Cock.  
Each..... \$30.00



Plain Force Pump.  
Each.....\$12.00



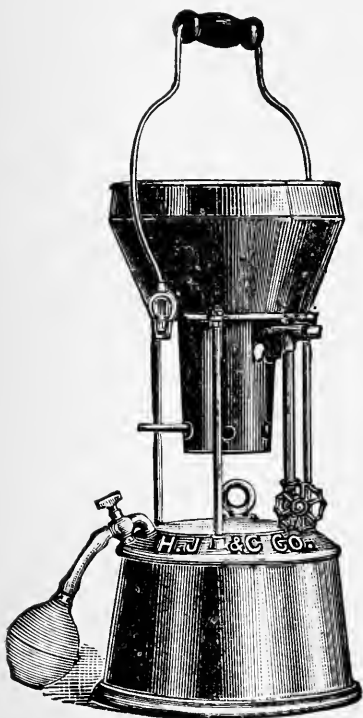
GAS FITTERS'  
PROVING PUMP  
AND GAUGES.

Pump with six feet of  $\frac{3}{8}$   
inch rubber hose, cock and  
mercury column.

Complete.....	\$25.00
Pump only.....	15.00
Mercury Gauge.....	10.00
Extra Glass Tubes for Mercury Gauge	1.00
Cock with Ether Cup	5.00
Hose, per foot.....	.50

THE "H. J. & C."

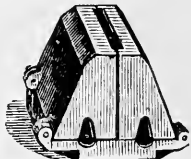
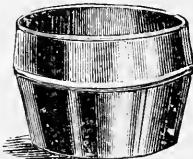
PLUMBERS' BLAST FURNACE.



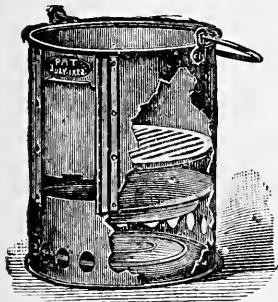
Weight of Furnace, 7 pounds.  
Height of Furnace, 17 inches.

This furnace has been on the market since the year 1878, and retains the first place as the most effective apparatus of the kind in use. It recommends itself as being safe, simple, quick, handy, reliable and economical. Full directions for use accompany each Furnace. A special pot made for Electric Lineman's use.

Furnace with two Shields, suitable for large or small solder pot.....Each, 6.00  
Furnace, with two Shields and Hood, for solder coppers....." 7.50



BOWSKY'S PLUMBERS' FURNACE.



No.	Diameter.	Height.	Weight.	Price.
4	8 inches.	14 inches.	9 pounds.	2.50
5	9 "	14 "	10 "	3.00
6	10 "	14 "	10 "	4.00

Extra Grates, No. 4 and No. 5, 30 cents ; No. 6, 40 cents.

IMPERIAL BLOW TORCH.

A complete tool for brazing, burning paint, thawing frozen pipes, etc.  
Burns four hours with one filling.

Price, each.....\$5.00



SOLDER POTS.

Sizes, inches.....	5	6	8	10½
Each.....	\$0.50	0.65	1.10	1.75

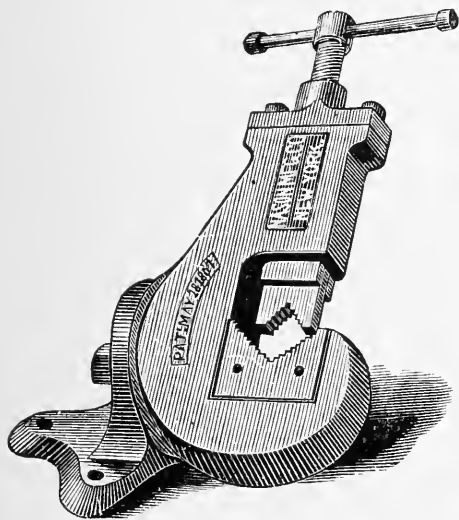


PIPE BENDERS.



For Bending Lead Pipe, Brass or Copper Tubing.

1 inch, per dozen.....	\$7.00	1½ inch, per dozen.....	\$10.00
1¼ " " ".....	8.00	2 " " ".....	12.00



NASON'S PATENT PIPE VISE.

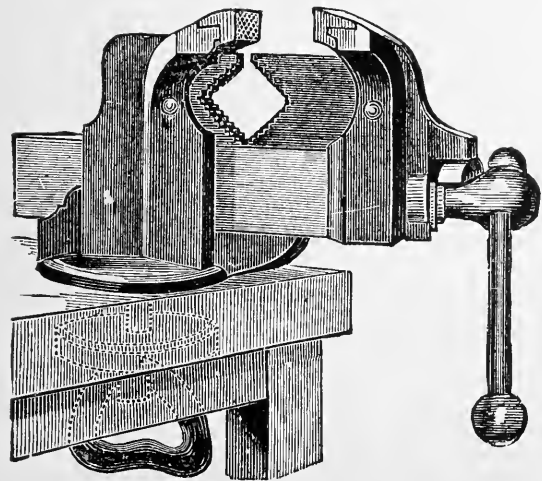
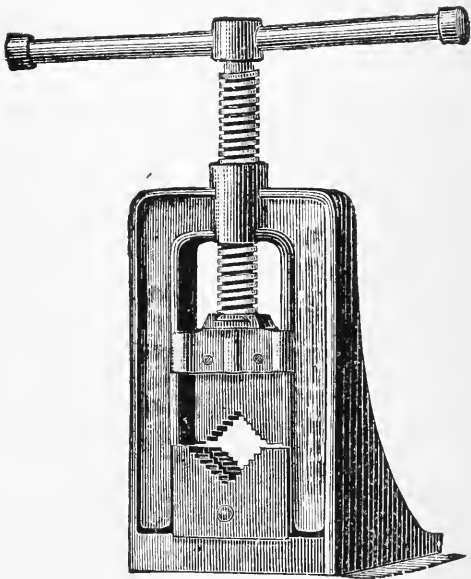
OPEN JAW—WILL TAKE PIPE AT ANY POINT.

Numbers.....	1	2	3
To take.....	$\frac{3}{8}$ to $1\frac{1}{4}$	$\frac{1}{4}$ to 2	$\frac{1}{4}$ to 3
Price .....	15.00	18.00	30.00

MALLEABLE IRON PIPE VISE.

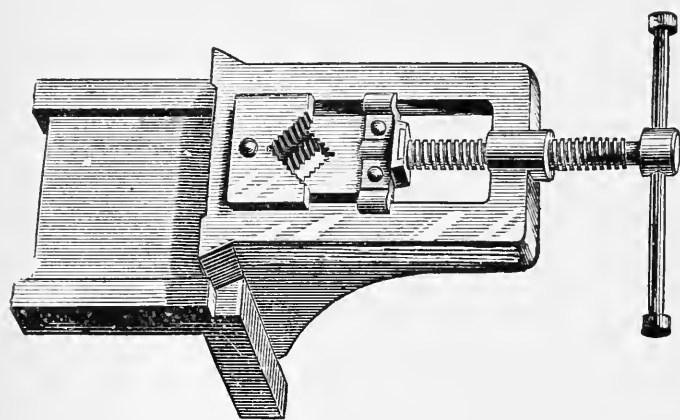
LIGHT, CHEAP AND DURABLE.

Numbers.....	1	2
To take. ....	$\frac{1}{8}$ to 2	$\frac{1}{4}$ to 3
Price .....	8.00	12.00



COMBINATION PIPE AND BENCH VISE.

Numbers.....	1	2
To take Pipe.....	$\frac{1}{8}$ to 2	$\frac{1}{2}$ to 3
Price .....	16.00	20.00

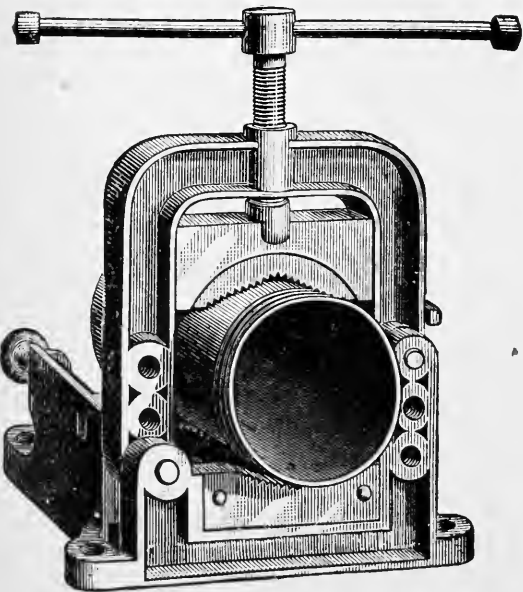
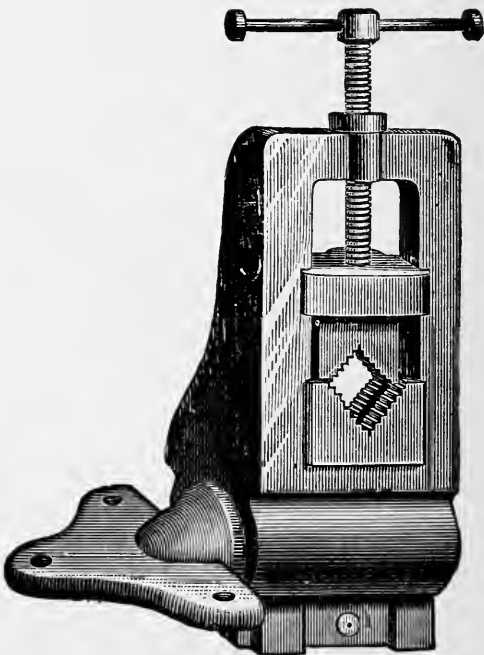


ANGLE PIPE VISE.

Numbers...	1,	2,	3,
To take....	$\frac{1}{8}$ to 2	$\frac{1}{4}$ to 3	$\frac{1}{2}$ to 4
Price,.....	11.00	17.00	28.00

IMPROVED SWIVEL PIPE VISE.

Numbers .....	1,	2,	3,
To take .....	$\frac{1}{8}$ to 2	$\frac{1}{8}$ to 3	$\frac{1}{4}$ to 4
Price.....	14.00	18.00	30.00

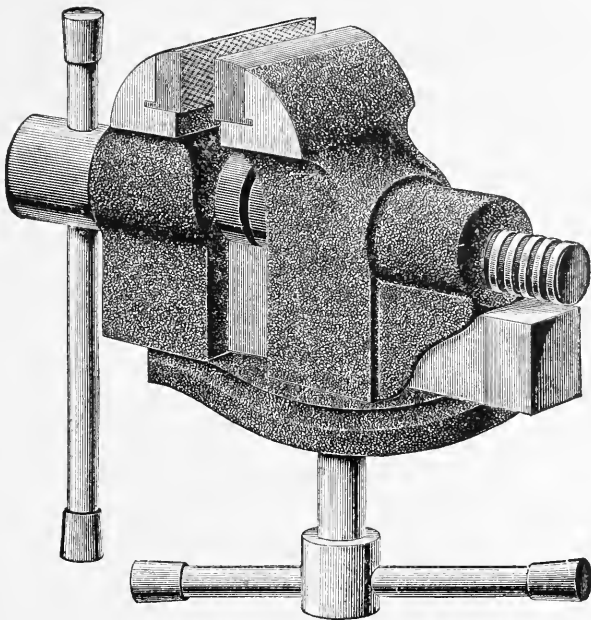


MALLEABLE HINGE  
PIPE VISE.

Numbers	1,	2,	3,	4,	5,
To take..	$\frac{1}{8}$ to 2	$\frac{1}{4}$ to 3	$\frac{1}{2}$ to 4	2 to 6	2½ to 8
Price.....	10.00	13.00	24.00	30.00	45.00

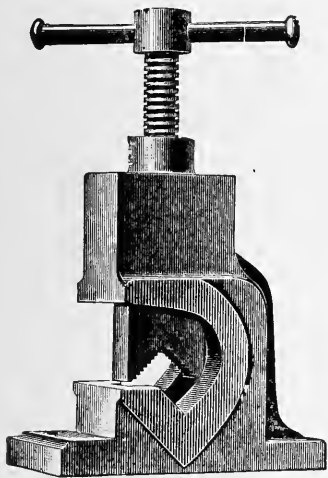


PIPE VISES.



WALWORTH PIPE VISES.

5 inch Jaw, for pipe  $\frac{1}{8}$  to 6 inch, each.....\$18.00

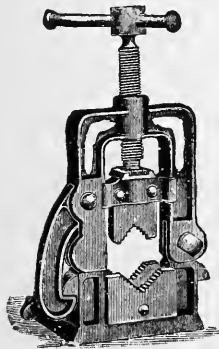


“KLINGFAST” PIPE VISE.

CAPACITIES :

No. 1 holds pipe  $\frac{1}{8}$  to  $1\frac{1}{2}$  inch, each.....\$3.00  
No. 2 “ “  $\frac{1}{8}$  to 2 “ “ ..... 5.00  
Made of best quality gray iron with tool steel jaw.

ARMSTRONG HINGED VISE.

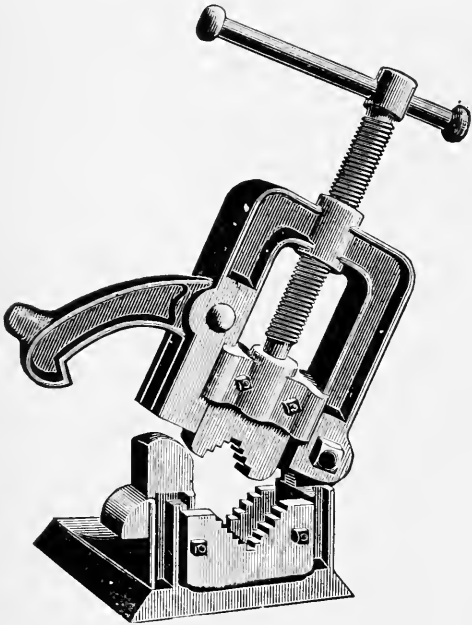


The Armstrong Improved Hinged Vise is simple in construction. They are made of the best malleable iron, on the interchangeable system, so that any of the parts can be replaced if it should become necessary.

No. 1 will hold from 0 to  $2\frac{1}{2}$  inch pipe, price.....\$10.00  
No. 2 “ “  $\frac{1}{2}$  to  $4\frac{1}{2}$  “ “ ..... 20.00

HINGED PIPE VISE.

No. 1 takes from  $\frac{1}{8}$  to  $2\frac{1}{2}$  in. Pipe. Weighs 16 lbs.  
No. 2     "      "       $\frac{1}{2}$      4     "      "      38     "

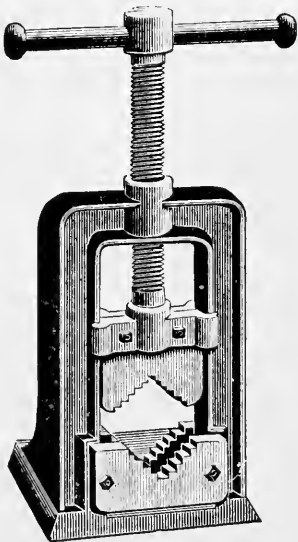


Jaws are forged from Tool Steel with the Teeth Milled. Frame is best malleable iron, screw is of steel, and handle is solid. The material and workmanship are first-class.

No. 1.....\$10 00  
No. 2.....20 00

TRUSTY PIPE VISE.

Takes from  $\frac{1}{8}$  to 2 in. Pipe. Weighs 16 lbs.  
A Superior Tool, unsurpassed in either material or workmanship.

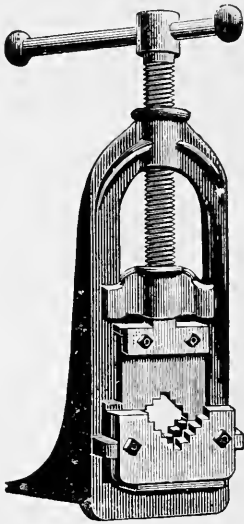


This is a first-class, high-grade tool, suited to heavy work. The frame is malleable, screw steel, and the Jaws are forged from Tool Steel, with the Teeth Milled.

Price.....\$8 00

SEVEN POUND STEEL VISE.

Takes all sized Pipe up to 2 inches.



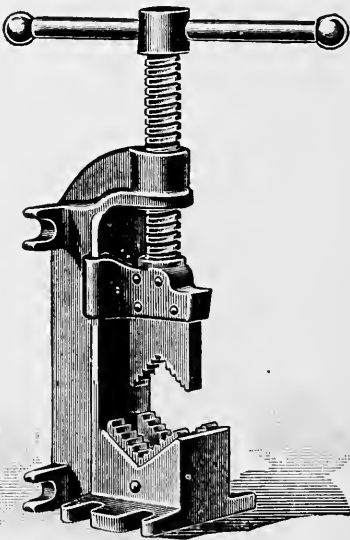
This Vise can be carried in a tool bag. It is made particularly for the plumber to carry about on jobbing where a vise is necessary.

Forged Steel Jaws.....\$4 50  
Cast Steel Jaws.....3 50

“SIDE ISSUE”

MALLEABLE PIPE VISE.

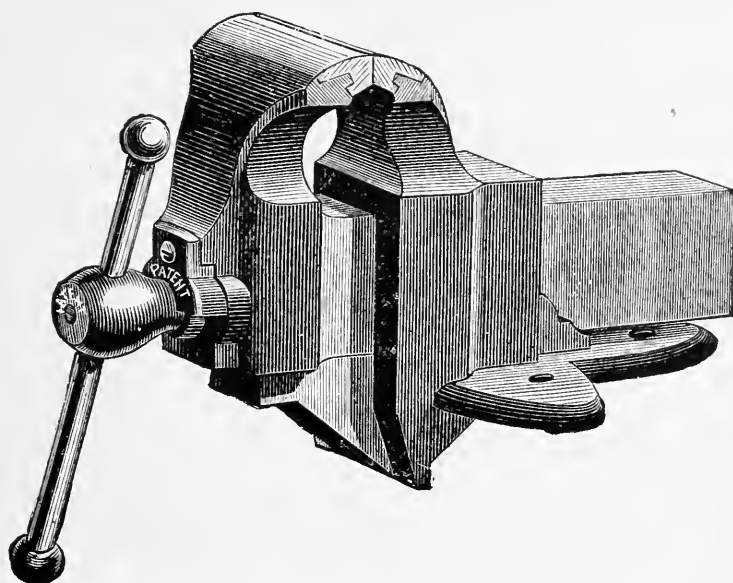
No. 1, Holding  $\frac{1}{8}$  to 2 in. Pipe. Weight, 15 lbs.  
No. 2,     "      2 to 6     "      "      90     "



Can be bolted in any position, making it a handy Vise for jobbing work.

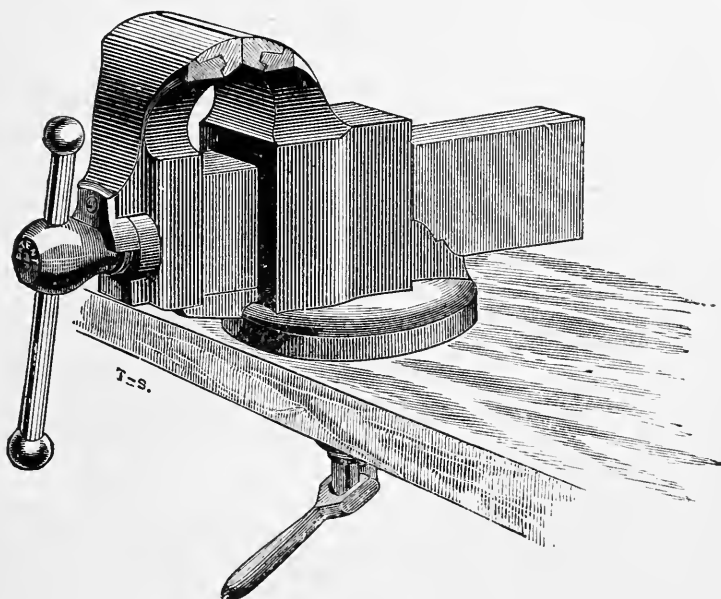
No. 1.....\$6 00  
No. 2.....27 00

# PARKER'S PATENT PARALLEL VISES.



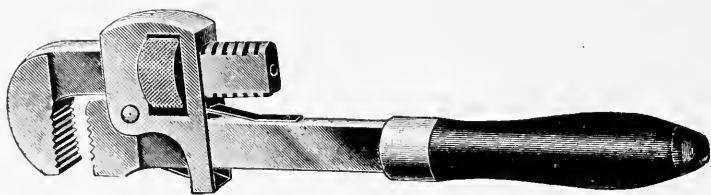
Numbers .....	000	1	2	3	4	5	6
Weight, lbs.....	23	31½	41½	59½	83	120	237
Length of jaws, inches.....	3¼	3⅝	4¼	4¾	5⅜	6⅛	8⅛
Price .....	6.25	7.00	9.00	11.75	16.25	24.00	50.00

# PARKER'S PATENT PARALLEL SWIVEL VISES.



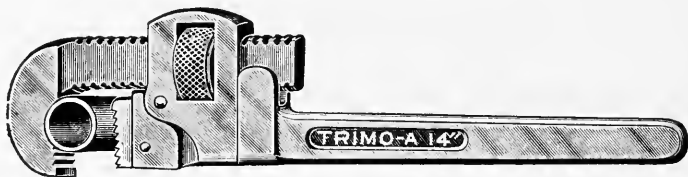
Numbers.....	23	24	25	26
Weight, lbs.....	48	63½	90	131
Length of jaws, inches. ....	4¼	4¾	5⅜	6⅛
Price.....	11.00	14.50	20.50	30.00

STILLSON'S PATENT WRENCH.



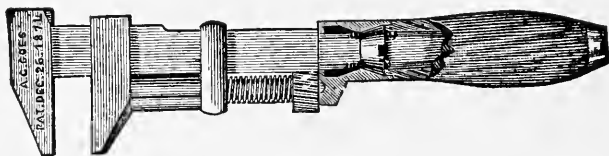
Length.....	6	8	10	14	18	24	36	48
Will take.....	$\frac{1}{8}$ - $\frac{1}{2}$	$\frac{1}{8}$ - $\frac{3}{4}$	$\frac{1}{8}$ -1	$\frac{1}{4}$ - $1\frac{1}{2}$	$\frac{1}{4}$ -2	$\frac{1}{4}$ - $2\frac{1}{2}$	$\frac{1}{2}$ - $3\frac{1}{2}$	1-5
Price.....	2.00	2.00	2.25	3.00	4.00	6.00	12.00	18.00
Extra Jaws.....	.67	.67	.75	1.00	1.33	2.00	4.00	6.00
“ Frames.....	.25	.25	.33	.45	.55	.65	.75	1.00
“ Nuts.....	.20	.20	.27	.35	.42	.50	.65	.80
Handles.....	.15	.15	.20	.25	.30	---	---	---

“TRIMO” WRENCH.



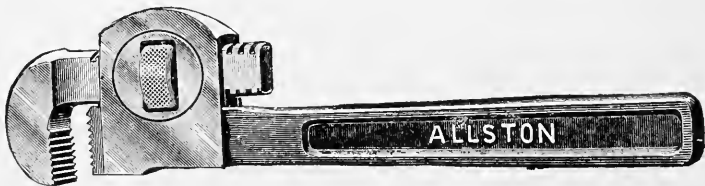
Length open, inch.	6	8	10	14	18	24	36	48
Takes from.....	$\frac{1}{8}$ in. wire to $\frac{1}{2}$ in. pipe.	$\frac{1}{8}$ in. wire to $\frac{3}{4}$ in. pipe.	$\frac{1}{8}$ in. wire to 1 in. pipe.	$\frac{1}{4}$ in. wire to $1\frac{1}{2}$ in. pipe.	$\frac{1}{4}$ in. wire to 2 in. pipe.	$\frac{1}{4}$ in. wire to $2\frac{1}{2}$ in. pipe.	$\frac{1}{2}$ in. pipe to $3\frac{1}{2}$ in. pipe.	1 in. pipe to 5 inch.
Price.....	2.00	2.00	2.25	3.00	4.00	6.00	12.00	18.00
Jaw.....	.67	.67	.75	1.00	1.33	2.00	4.00	6.00
Nut.....	.20	.20	.27	.35	.42	.50	.65	.80
Inserted Jaw.....	.25	.25	.33	.50	.55	.65	1.00	1.25
Frame.....	.25	.25	.33	.45	.55	.65	.75	1.00

COES' WRENCHES.



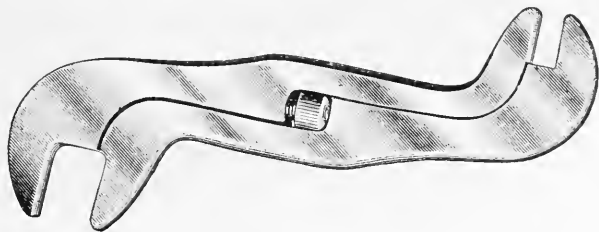
Sizes.....	6	8	10	12	15	18	21
Price, Black.....	.75	.85	1.00	1.17	2.00	2.50	3.00
“ Bright.....	.85	.95	1.17	1.35	2.17	2.75	3.25

ALLSTON WRENCH.



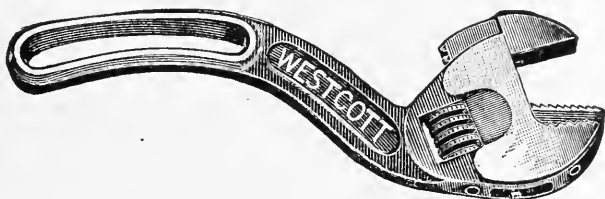
Length Open.....	6	8	10	14	18	24	36	48
Grips.....	$\frac{1}{8}$ in. wire to $\frac{1}{2}$ in. pipe.	$\frac{1}{8}$ in. wire to $\frac{3}{4}$ in. pipe.	$\frac{1}{8}$ in. wire to 1 in. pipe.	$\frac{1}{4}$ in. wire to $1\frac{1}{2}$ in. pipe.	$\frac{1}{4}$ in. wire to 2 in. pipe.	$\frac{1}{4}$ in. wire to $2\frac{1}{2}$ in. pipe.	$\frac{1}{2}$ in. pipe to $3\frac{1}{2}$ in. pipe.	1 in. pipe to 5 in. pipe.
Each.....	2.00	2.00	2.25	3.00	4.00	6.00	12.00	18.00
Extra Jaws.....	.67	.67	.75	1.00	1.33	2.00	4.00	6.00
Extra Handles.....	.15	.15	.20	.25	.30	---	---	---
Extra Nuts.....	.20	.20	.27	.35	.42	.50	.65	.80

BAXTER'S ADJUSTABLE "S" WRENCH.



Length.....	4	6	8	10	12	15
Price .....	.50	.75	1.00	1.50	2.00	2.50

WESTCOTT ADJUSTABLE "S" PIPE WRENCH.



WITH PIPE JAW.

8 inch takes pipe from	$\frac{1}{8}$ to $\frac{3}{4}$ inch.....	\$1.25
10 " " " " "	$\frac{1}{8}$ " 1 " .....	1.50
12 " " " " "	$\frac{1}{8}$ " $1\frac{1}{4}$ " .....	2.00
14 " " " " "	$\frac{1}{8}$ " $1\frac{1}{2}$ " .....	2.50

WITH SMOOTH JAW.

8 inch opens to	1 inch.....	\$ .75
10 " " " "	$1\frac{3}{8}$ " .....	1.00
12 " " " "	$1\frac{5}{8}$ " .....	1.25
14 " " " "	2 " .....	1.75



ALLIGATOR WRENCH.

Number.....	1,	2,	3,	4,	5,	Twin.
Holds Pipe, inches,..	$\frac{1}{8}$ to $\frac{3}{8}$	$\frac{3}{8}$ to $\frac{3}{4}$	$\frac{1}{2}$ to $1\frac{1}{4}$	$1\frac{1}{4}$ to 2	2 to 3	$\frac{1}{8}$ to $\frac{3}{4}$
" Round Iron in.	$\frac{1}{4}$ to $\frac{3}{4}$	$\frac{1}{2}$ to 1	$\frac{3}{4}$ to $1\frac{3}{8}$	$1\frac{1}{2}$ to $2\frac{1}{2}$	$2\frac{1}{4}$ to $3\frac{1}{2}$	$\frac{1}{4}$ to 1
Length, inches,.....	5 $\frac{3}{4}$	10	16	22	27	10
Price, per dozen,....	\$4.00	12.00	24.00	36.00	54.00	28.00

CLIMAX RATCHET WRENCH.



No. 1 Wrench and 5 Sockets.....	\$2.25	No. 2 Wrench and 5 Sockets.....	\$3.25
No. 1 Wrench, 9 ins. long (no Sockets) -	1.75	No. 2 Wrench, 11 ins. long (no Sockets)-	2.50
Drill Socket for No. 1 Wrench.....	1.50	Drill Socket for No. 2 Wrench.....	2.00
No. 3 Wrench and 4 Sockets.....	\$4.50		
No. 3 Wrench, 15 ins. long (no Sockets) .....	3.50		
Drill Socket for No. 3 Wrench.....	2.50		

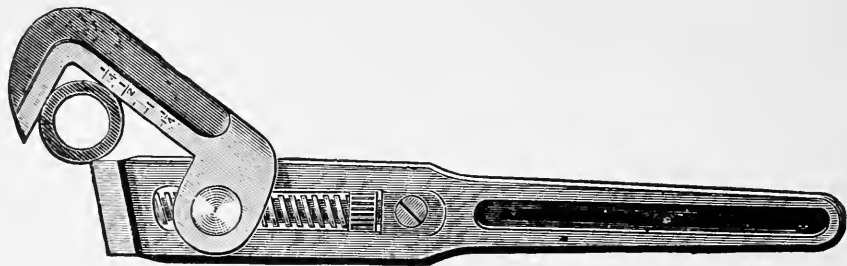
The three Wrenches take all sizes up to and including 1 inch of Set Screws, Square and Hexagon Head Cap Screws, Square and Hexagon Nuts (both United States and Manufacturers' Standard) and Lag Screws.

WROUGHT IRON KEY WRENCH.



Length of Jaw.....	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5
Price.....	3.00	4.00	5.00	6.00	8.00	10.00

HALL'S IMPROVED PIPE WRENCH.

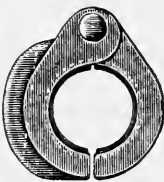
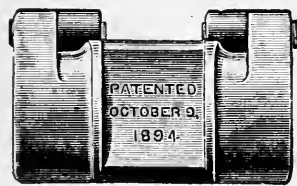


It is quickly adjusted to different sizes of Pipe, and grips, quickly and firmly, galvanized as well as other Pipe. It releases instantly, and cannot lock on the Pipe.  
Having only one gripping point it mars the Pipe less, and acts more like the old Pipe Tongs than any other Wrench.  
It can be easily sharpened on any grindstone or emery wheel, without taking apart.  
It has no springs or other parts to break or get out of order.  
The jaws are smooth and parallel, and will not mar a nut or highly polished fittings.  
When used with Hall's Elastic Pipe Clamps, it will grip the thinnest and most highly polished Pipe or Tubing without marking or crushing it.

Length Open.....	Inches,	6"	10	14	18	24
Size of Pipe.....	"	0 to 1/2	1/8 to 3/4	1/4 to 1 1/4	1/4 to 1 1/2	1/2 to 2 1/2
Largest Opening {	"	7/8	1 3/8	2	2 1/4	3 1/4
for Nut or Bolt, }						
Price.....	Each,	\$2.00	2.50	3.00	4.00	6.00

The 6-inch are Nickel Plated.

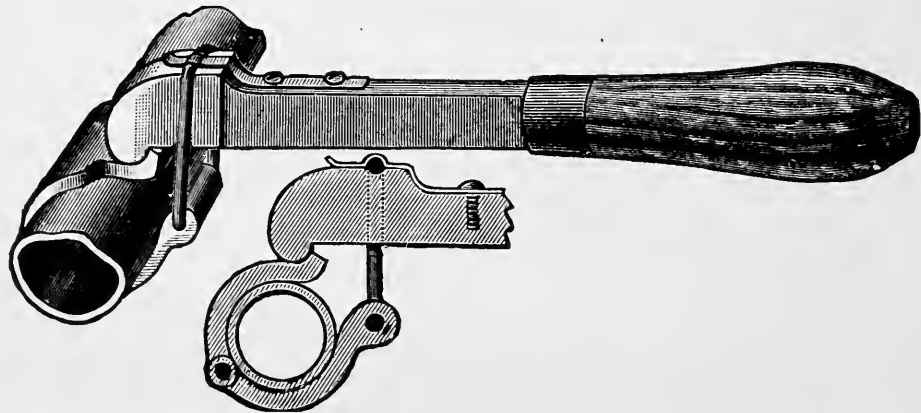
ELASTIC PIPE CLAMP.—FOR BRASS PIPE.  
FOR HALL WRENCH.



Outside Diameter of Pipe or Tubing.	Size Wrench Required.	Price Each.
3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 1	in. --- 10 or 14 in.	\$ .75
1 1/16, 1 1/8, 1 1/4, 1 5/16, 1 3/8, 1 1/2	" --- 14 or 18 "	1.00
1 5/8, 1 11/16, 1 3/4, 1 7/8, 2	" --- 18 or 24 "	1.25
	" --- 24 "	1.75

HAYDEN PIPE WRENCH.

FOR BRASS AND NICKEL PIPE.

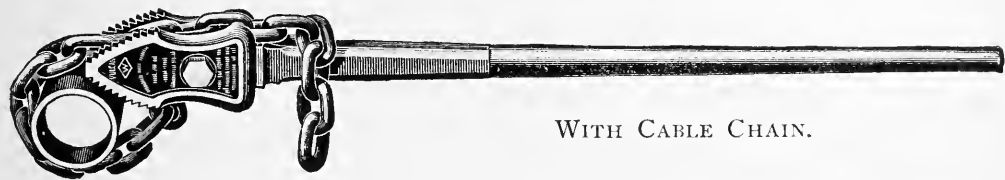


No. 2.—10 inch Wrench Bar (only).....	\$1.25
1/2, 3/4, and 1 inch Clamps for No. 2 Wrench, each.....	.75
No. 3.—18 inch Wrench Bar (only).....	2.50
1 1/4, 1 1/2, and 2 inch Clamps for No. 3 Wrench, each.....	1.50

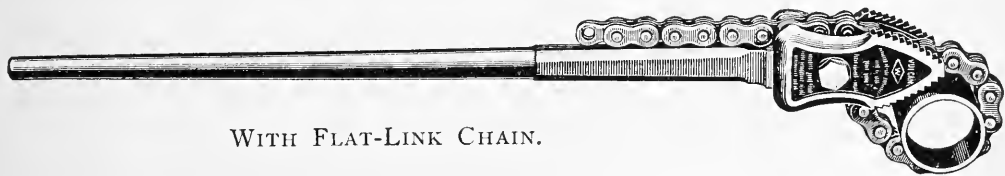
Made from forged steel, and is the only wrench made which won't mark or crush the pipe. It can be ratcheted same as any wrench.

VULCAN PATENT DROP FORGED STEEL CHAIN  
PIPE WRENCH.

For Gripping, Turning or Holding Pipe, Bolts, Bars, Shafts, etc., from 1/8 to 18 inches  
Diameter. Eight Sizes. With either Cable or Flat-Link Chain.



WITH CABLE CHAIN.



WITH FLAT-LINK CHAIN.

To change the chain, unscrew one cap-screw, BUT REMOVE NEITHER JAW; slip  
out the internal pin on which the chain swings, thus releasing the chain; insert new chain,  
replace pin and cap-screw, screwing the latter firmly into place.

DESCRIPTIVE PRICE LIST.

	No. 10	No. 11	No. 12	No. 13	No. 13½	No. 14	No. 15
Size .....	1/8 to 3/4 in.	1/8 to 1½ in.	1/4 to 2½ in.	3/4 to 4 in.	1 to 6 in.	1½ to 8 in.	2 to 12 in.
Price, with flat-link chain, each.	\$2.50	3.50	5.00	7.00	9.00	11.00	18.00
Price, with cable chain, each....	\$2.25	3.25	4.50	6.25	7.75	9.50	16.00
Capacity, size pipe.....	1/8 to 3/4 in.	1/8 to 1½ in.	1/4 to 2½ in.	3/4 to 4 in.	1 to 6 in.	1½ to 8 in.	2 to 12 in.
Length over all.....	13¾ in.	20 in.	27 in.	37 in.	44½ in.	50½ in.	64½ in.
Weight.....	1¾ lbs.	4¾ lbs.	8¾ lbs.	16 lbs.	21 lbs.	29 lbs.	49 lbs.
Extra flat-link chains, each.....	\$0.75	1.00	1.50	2.50	3.25	4.00	6.00
Extra cable chains, each.....	\$0.50	.75	1.00	1.75	2.00	2.50	4.00
Extra jaws, pair.....	\$1.00	1.75	2.75	4.00	4.75	5.50	7.50
Length flat-link chain.....	9½ in.	13½ in.	17½ in.	22½ in.	31 in.	39 in.	54½ in.
Length cable chain.....	9¾ in.	14½ in.	18 in.	27 in.	33½ in.	42 in.	57 in.

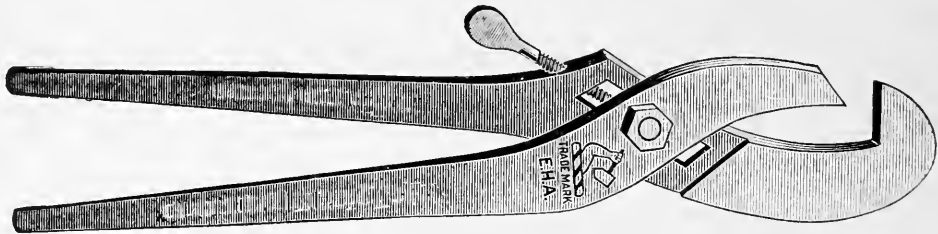
ROBBINS' CHAIN TONGS.



Numbers	2	3	4	5	6
Will take.....	1—2	1¼—5	2—7	2½—10	2½—12
Price .....	\$5.50	6.25	9.00	12.50	16.00
Length .....	27 in.	3 ft.	4 ft.	5 ft.	-----

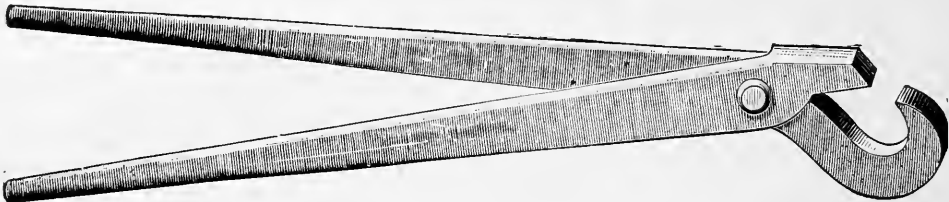


BROWN'S ADJUSTABLE PIPE TONGS.



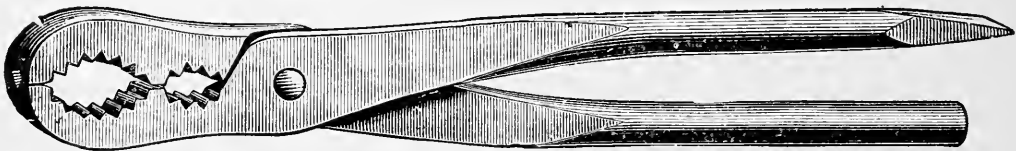
No. 1, for 1/8 to 3/4 inch Pipe	.60	No. 3, for 1 to 2 inch Pipe	1.20
No. 1 1/2, " 3/8 to 1 " "	.75	No. 4, " 1 1/2 to 3 " "	2.70
No. 2, " 1/2 to 1 1/4 " "	.85	No. 5, " 2 1/2 to 4 " "	6.00

COMMON PIPE TONGS.



Sizes, inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Prices, each	.60	.65	.70	.75	.90	1.10	1.30	1.50	1.90	2.50	3.50

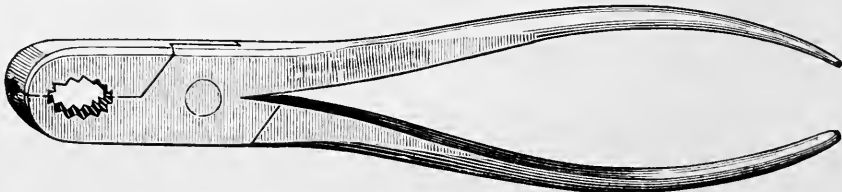
GAS PIPE PLIERS.



BLACK HANDLES, POLISHED HEADS.

Length, inches	8	9	10	11	12	13	14
Per dozen	12.00	14.00	15.00	16.00	18.00	21.00	24.00
Polished complete, add \$2.00 to lists.							

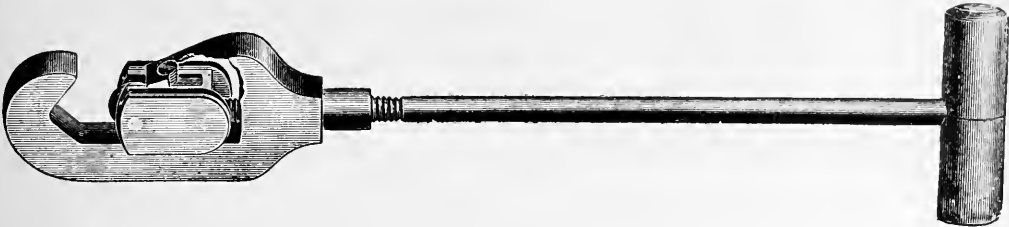
BURNER PLIERS.



POLISHED COMPLETE.

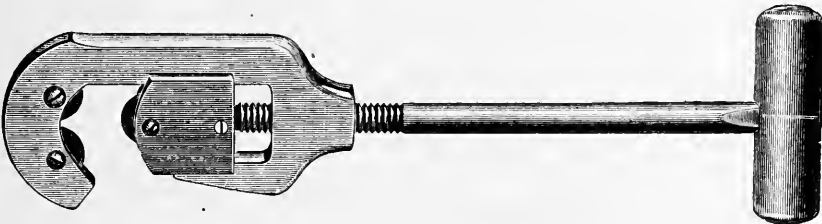
Length, inches	5	6	7
Per dozen	8.00	9.00	10.00
Nickel plated	10.00	11.00	12.00

STANWOOD IMPROVED PIPE CUTTER.



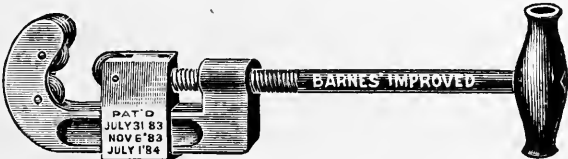
No. ....	I	2	3
Cuts Pipe .....	$\frac{1}{8}$ to I	$\frac{3}{4}$ to 2	2 to 3
Each .....	1.50	2.25	7.00
Extra Blocks and Wheels, each .....	.45	.60	1.25
Extra Wheels, each .....	.12	.18	.25
Pins, each .....	.05	.05	.08

STANWOOD IMPROVED THREE-WHEEL PIPE CUTTER.



No. ....	I	2	3
Cuts Pipe .....	$\frac{1}{8}$ to I	$\frac{1}{2}$ to 2	$1\frac{1}{4}$ to 3
Each .....	4.50	6.00	10.00
Extra Small Wheels, each .....	11	.12	.18
Extra Large Wheels, each .....	.16	.18	.25
Extra Blocks, each .....	.60	.90	1.50

BARNES' PIPE CUTTER.



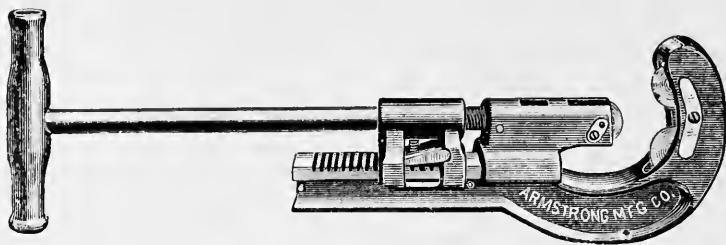
No. ....	I	2	3	4	5	6	7
Cuts Pipe .....	$\frac{1}{8}$ to I	$\frac{1}{2}$ to 2	$1\frac{1}{2}$ to 3	$2\frac{1}{2}$ to 4	4 to 6	6 to 8	9 to 12
Each .....	4.50	6.00	10.00	20.00	30.00	40.00	50.00
Extra Wheels, each .....	.25	.30	.40	.50	.75	.75	.75
Extra Wheel Pins, per dozen ....	1.00	1.00	1.00	2.00	2.00	2.00	2.00

SAUNDERS' PIPE CUTTER.



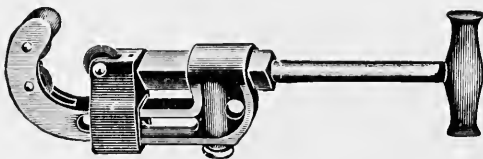
No. ....	I	2	3	4	5
Cuts Pipe .....	$\frac{1}{8}$ to I	1 to 2	2 to 3	$2\frac{1}{2}$ to 4	4 to 6
Each .....	3.00	4.50	11.00	18.00	28.00
Extra Blocks and Wheels, each .....	1.25	1.75	2.75	3.50	4.00
Extra Wheels, each .....	.24	.32	.60	.60	.60
Extra Rollers, each .....	.24	.32	.50	.50	.60
Extra Pins .....	.10	.10	.15	.15	.15

ARMSTRONG PIPE CUTTER.



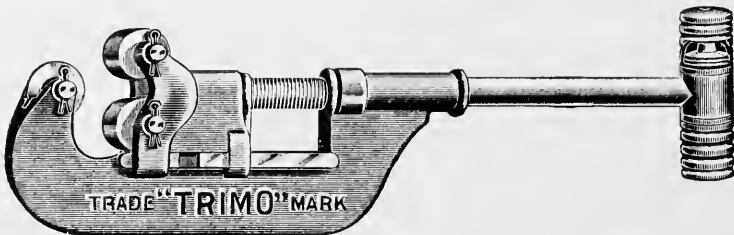
No .....	1	2	3
Cuts Pipe .....	$\frac{1}{8}$ to $1\frac{1}{4}$	$\frac{1}{2}$ to $2\frac{1}{2}$	$1\frac{1}{2}$ to 4
Each .....	\$4.50	6.00	15.00
Wheels or Rollers, each .....	.25	.30	.50

CURTIS PIPE CUTTER.



Number.	Range.	Price.
2	$\frac{1}{8}$ in. to 2 in.	\$6.00

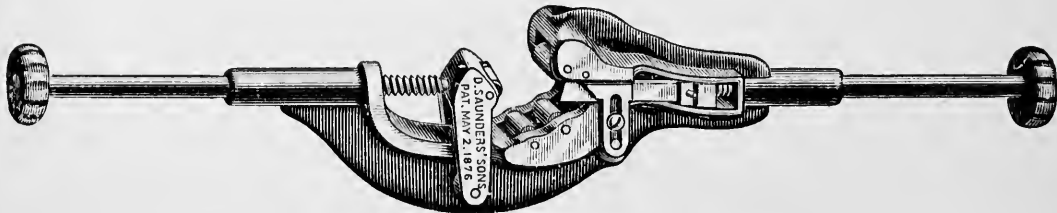
“TRIMO” PIPE CUTTER.



Size	No. 1	No. 2	No. 3
Cuts Pipe .....	$\frac{1}{8}$ to $1\frac{1}{4}$	$\frac{1}{2}$ to 2	$1\frac{1}{4}$ to 3
Price, with two extra wheels, interchangeable nut and special handle .....	\$4.25	6.25	12.25
Extra nuts, each .....	.35	.35	.40
Extra wheels, each .....	.30	.30	.40
Extra rolls, each .....	.25	.30	.50
Extra pins with cotter pins, per doz .....	1.00	1.00	1.00
Extra anti-friction washers, per doz .....	.60	.60	.60
Extra fork block carrier, each .....	.10	.10	.10

SAUNDERS' TOOL CUTTER.

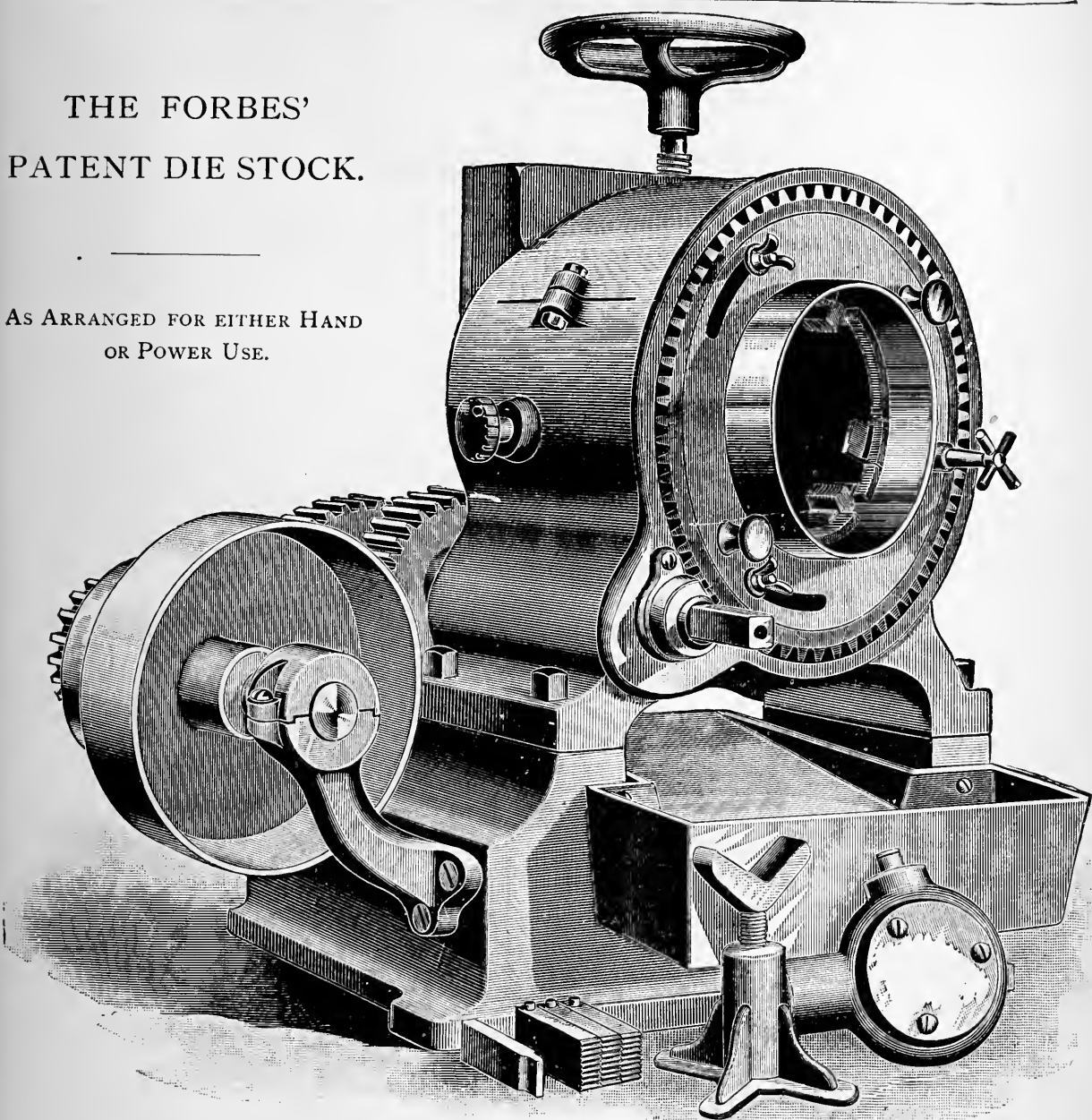
FOR CUTTING BRASS, COPPER AND IRON TUBE, ETC.



	Complete Cutters.	Extra Plain Rollers.	Extra Tools.	Extra Block and Rollers.	Extra Bead Rollers.	Extra Pins.
No. 1, Cuts $\frac{1}{8}$ to 1 inch .....	\$6.50	.24	.18	1.25	.40	.10
No. 2, " 1 to 2 " .....	8.00	.32	.25	1.75	.60	.12
No. 3, " 2 to 3 " .....	16.00	.50	.35	3.25	1.00	.15
No. 4, " $2\frac{1}{2}$ to 4 " .....	25.00	.75	.45	4.25	1.25	.15

# THE FORBES' PATENT DIE STOCK.

AS ARRANGED FOR EITHER HAND OR POWER USE.



No. 78 Power Machine.

THESE MACHINES CAN BE TAKEN FROM THE BASE AND USED AS HAND MACHINES.

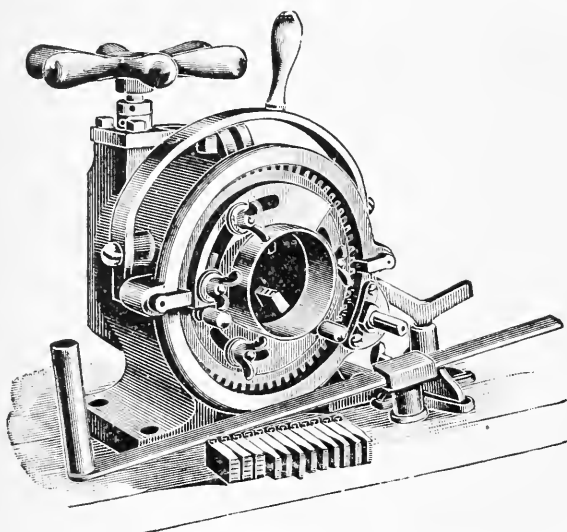
The following prices include counter-shaft, ratchet wrench and pipe rest.

## PRICE LIST.

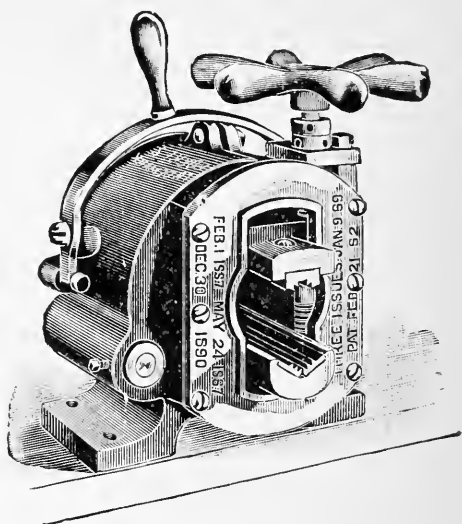
NUMBER.		RANGE.	WEIGHT.	PRICE.
* 70	power	$\frac{1}{4}$ to 2 inch R. and L.	250 lbs.	\$100.00
* 72	"	$\frac{1}{4}$ to 2 inch for Solid Dies.	245 "	95.00
* 74	"	1 to 3 in. R. H., 1 to 2 in. L. H.	300 "	125.00
* 76	"	$\frac{3}{4}$ to 3 in. R. H., $\frac{3}{4}$ to 2 in. L. H.	330 "	135.00
78	"	2 $\frac{1}{2}$ to 4 inches. R. H.	330 "	140.00
80	"	1 $\frac{1}{2}$ to 4 " R. H.	330 "	150.00
82	"	1 $\frac{1}{2}$ to 4 " R. & L.	330 "	165.00
84	"	1 to 4 " R. H.	330 "	160.00
86	"	1 to 4 " R. & L.	335 "	180.00
88	"	4 to 6 " R. H.	440 "	170.00
90	"	3 $\frac{1}{2}$ to 6 " R. H.	450 "	180.00
92	"	2 $\frac{1}{2}$ to 5 " R. H.	500 "	200.00
94	"	2 $\frac{1}{2}$ to 6 " R. H.	510 "	225.00
96	"	1 to 6 " R. H.	515 "	250.00
98	"	1 to 6 " R. & L.	520 "	285.00
100	"	2 $\frac{1}{2}$ to 8 " R. H.	900 "	500.00
102	"	2 $\frac{1}{2}$ to 10 " R. H.	1300 "	700.00

\* Are not fitted with Cut-off Attachment.

Nos. 30 AND 32, FORBES' PATENT DIE STOCK.



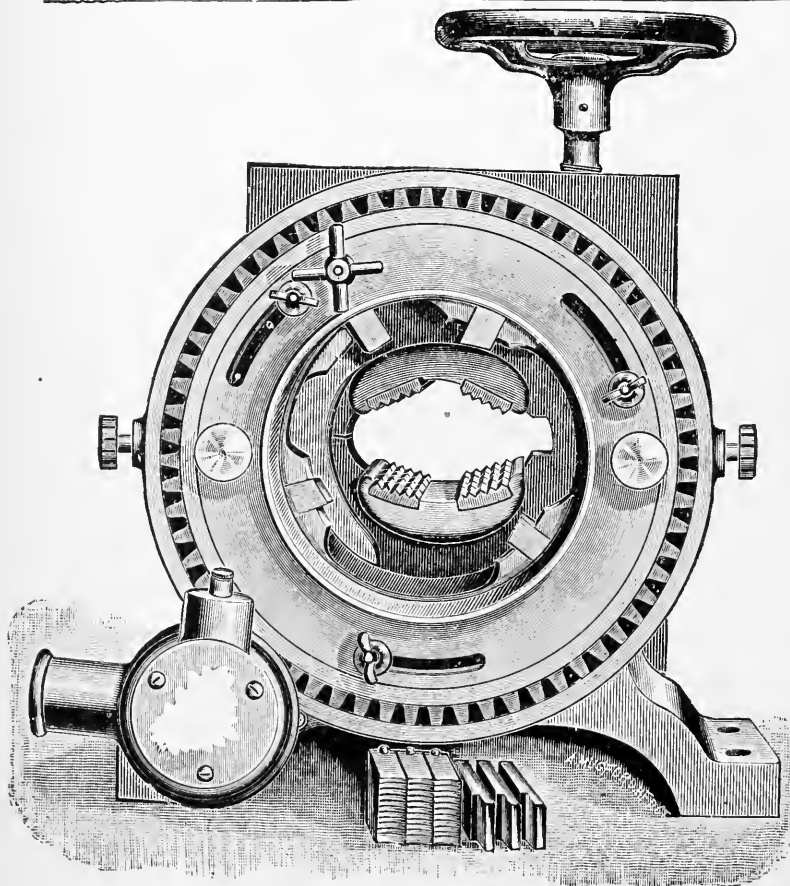
Front View.



Back View.

PRICE LIST.

NUMBER.	RANGE.	WEIGHT.	PRICE.
30	1/4 to 2 inch, both Right and Left.	80 pounds	\$50 00
32	1/4 to 2 inch for Solid Dies.	75 "	45.00
34	1 to 3 inch R. H., 1 to 2 inch L. H.	115 "	75.00
36	3/4 to 3 inch R. H., 3/4 to 2 inch L. H.	120 "	85.00



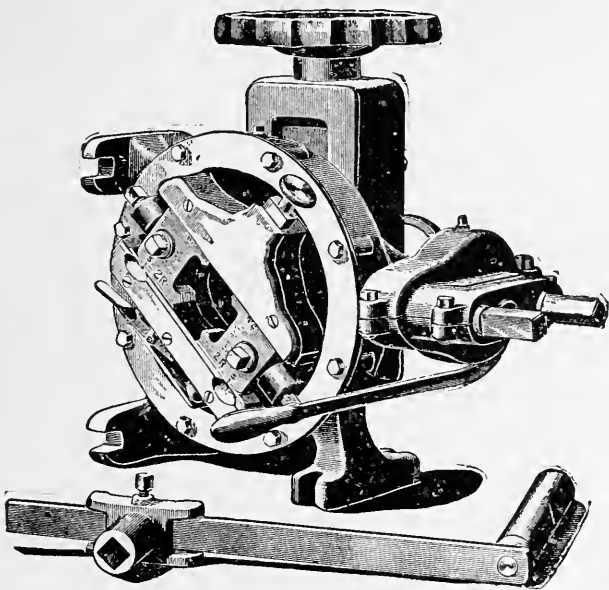
Front View No. 46 Machine.

These Machines have Opening and Adjustable Dies.

PRICE LIST.

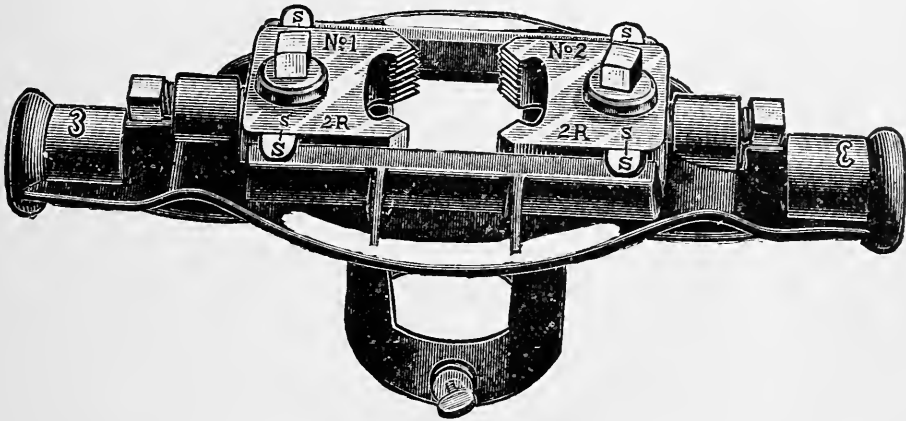
NO.	RANGE.	WEIGHT.	PRICE, HAND.
46	2 1/2 to 4 inches.	175 lbs.	\$85.00
38	1 1/2 to 4 "	175 "	100.00
40	1 1/2 to 4 "	180 "	115.00
42	1 to 4 "	180 "	110.00
44	1 to 4 "	185 "	130.00
50	4 to 6 "	310 "	115.00
52	3 1/2 to 6 "	315 "	130.00
54	2 1/2 to 5 "	320 "	150.00
56	2 1/2 to 6 "	325 "	175.00
62	2 1/2 to 6 "	750 "	300.00
	Extra Heavy.		
58	1 to 6 inches.	330 "	100.00
60	1 to 6 "	335 "	235.00
64	2 1/2 to 8 "	600 "	325.00
66	2 1/2 to 10 "	750 "	570.00

ARMSTRONG'S ADJUSTABLE STOCKS AND DIES.



	Without Stand.	With Stand.
No. o Hand Machine, without Dies .....	\$50.00	\$60.00
No. o " " with Pipe Dies, 1/4 to 2 in. R. H. ....	60.00	70.00
No. o " " with Bolt Dies 1/2 to 1 1/2 R. H. ....	60.00	70.00
	Power Attach. (no Countershaft.)	Power Attach. and Countershaft.
No. o Machine, without Dies .....	\$65.00	\$93.00
No. o " with Pipe Dies 1/4 to 2 in. R. H. ....	75.00	103.00
No. o " with Bolt Dies, 1/2 to 1 1/2 in. ....	75.00	103.00
No. o " Pipe Dies, 1/4-2 in. R. H. with Stand .....	85.00	113.00
No. c Machine Power Attachment, no Countershaft .....		\$15.00
No. c Machine Countershaft .....		28.00
No. o Machine Stand .....		10.00

Unless specified, Machine is shipped without Stand and for hand use.



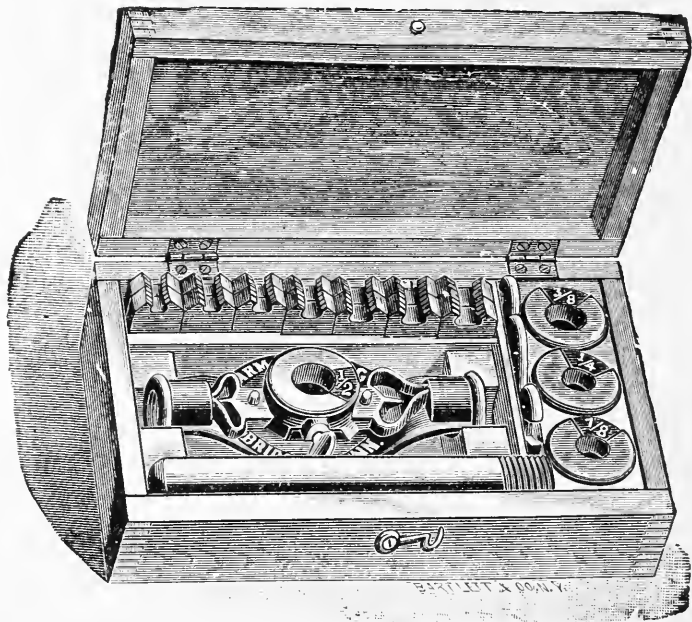
Adjustable Stock No. 3 and Pipe Dies.

No. 3 Stock, 3 sizes, Pipe Dies, 1 1/4 inch to 2 inch Right .....	\$20.00
No. 3 " 4 " " " I " " 2 " " .....	24.00
No. 3 " 5 " " " 3/4 " " 2 " " .....	28.50
No. 3 " 3 " " " 1 1/4 " " 2 " " and Left .....	32.00
No. 3 " 4 " " " I " " 2 " " " .....	40.00
No. 3 " 5 " " " 3/4 " " 2 " " " .....	48.50

Extra Dies, each, No. 1, 1/4 to 1/2, 1.25; No. 2, 1/4 to 1, 1.50; No. 3, 1 to 2, 4.00.  
" Bushings, each, .20, .25. .50.

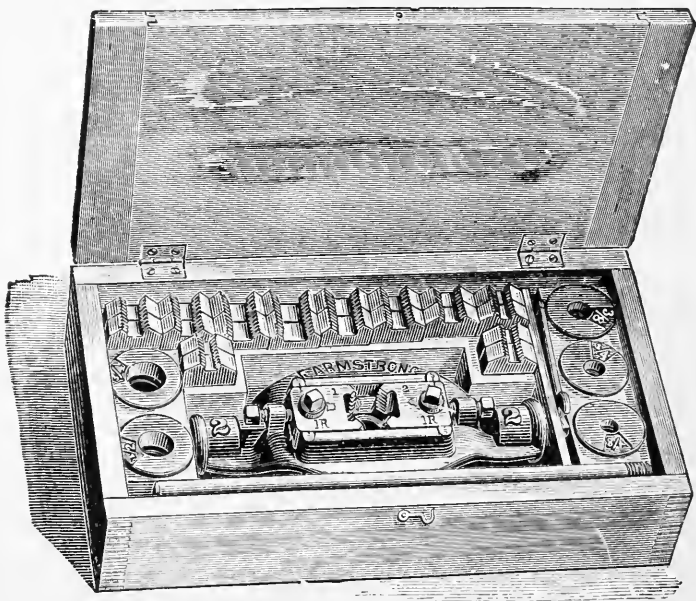


ARMSTRONG'S ADJUSTABLE STOCKS AND DIES.



ADJUSTABLE STOCK NO. 1 AND DIES FOR THREADING PIPE.

No. 1 Stock, 4 Right Hand Pipe Dies, $\frac{1}{8}$ to $\frac{1}{2}$ in., each.....	\$9.00
No. 1 Stock, 4 each Right and Left Pipe Dies, $\frac{1}{8}$ to $\frac{1}{2}$ in., each.....	14.00

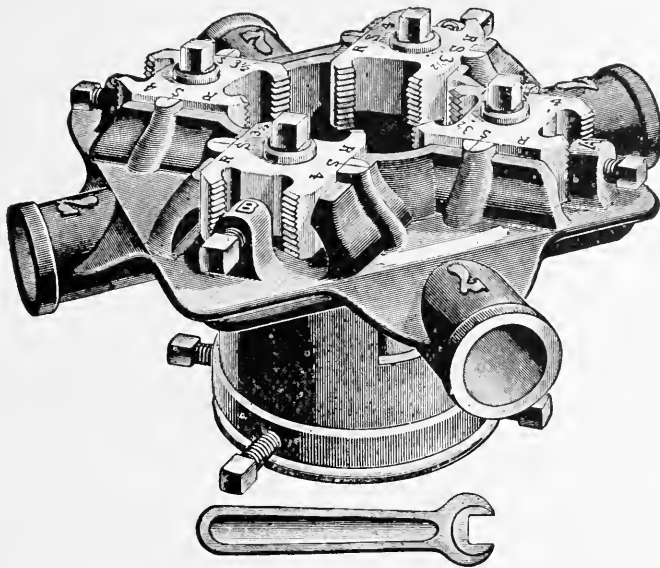


ADJUSTABLE STOCK NO. 2 AND DIES FOR THREADING PIPE.

No. 2 Stock, 5 Pipe Dies, Right, $\frac{1}{4}$ to 1 inch.....	\$12.00
No. 2 " 6 " " " $\frac{1}{8}$ " 1 " .....	14.00
No. 2 " 5 " " Right and Left, $\frac{1}{4}$ to 1 inch.....	20.00
No. 2 " 6 " " " " " $\frac{1}{8}$ to 1 " .....	23.00



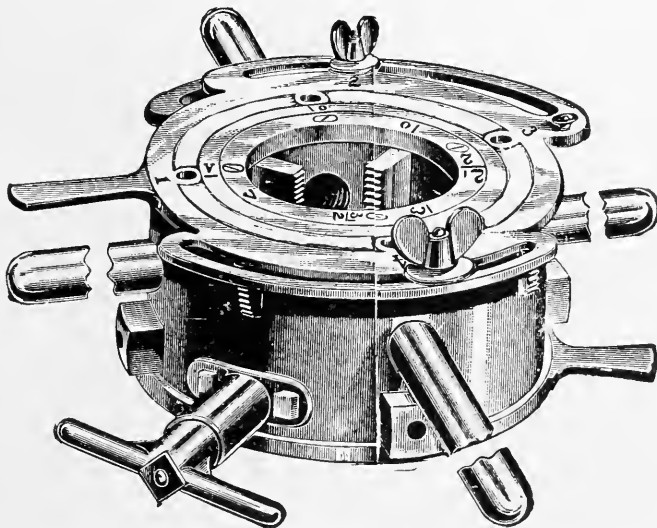
# ADJUSTABLE STOCKS.



ARMSTRONG ADJUSTABLE STOCK No. 7.

No. 7	Stock, Cutting	2½, 3, 3½, 4	Right	.....	\$60.00
No. 7	"	"	2½ and 3	Right	..... 45.00
No. 7	"	"	3½ " 4	"	..... 45.00
No. 7	"	"	2½ to 4	"	..... 92.00
No. 7	"	"	2½ and 3 or 3½ and 4, R. and L.	.....	60.00

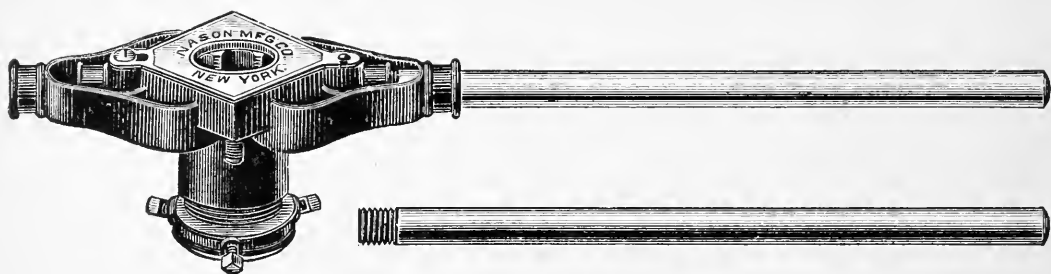
# JARECKI PATENT SCREW PLATE AND PIPE CUTTER.



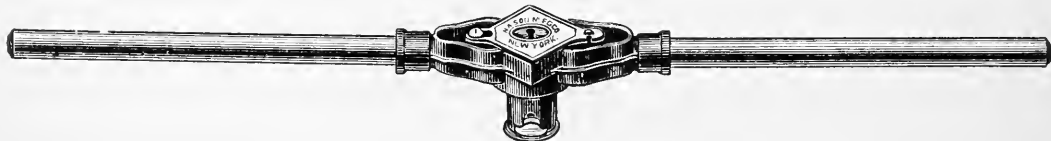
No.	Threads and Cuts	1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4, 5, 6, 7, 8							
No. 1									
" 2	"	"	1/4, 3/8, 1, 1 1/4	\$14.00	Shipping Weight, boxed, 12lbs.	"	"	24	"
" 3	"	"	1, 1 1/4, 1 1/2, 2	16.00	"	"	"	32	"
" 3 1/2	"	"	1 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	20.00	"	"	"	34	"
" 4 A	"	"	1 1/2, 2, 2 1/2, 3	22.50	"	"	"	84	"
" 4 B	"	"	2 1/2, 3, 3 1/2, 4	35.00	"	"	"	88	"
" 5	"	"	4 1/2, 5, 6	50.00	"	"	"	108	"
" 5 A	"	"	6, 7, 8	75.00	"	"	"		"
				125.00					

Number.....	1	2	3	3 1/2 2 Sets	4 A	4 B	5	5 A
Dies, per set, right or left hand,	\$2.00	2.00	2.00	4.00	3.00	3.00	6.00	6.00
Knives.....	.40	.40	.40	.40	.50	.50	.60	.60

MALLEABLE IRON STOCKS WITH DIES AND GUIDES,  
FOR SCREWING IRON PIPE.



COMMON STOCKS WITH SOLID DIES.



Numbers.....	0	1*	1½
Pipe Sizes of Dies.....	⅛, ¼, ⅜, ½.	¼, ⅜, ½, ¾, 1.	¾, 1, 1¼.
Dimensions of Dies.....	2 x ½	2½ x ¾	3 x ¾
Complete with R. H. Dies.....	9.50	15.00	13.50
Stocks only.....	3.50	5.00	6.00
Extra Dies, Right or Left.....	1.50	2.00	2.50
Extra Guides.....	.25	.35	.45
Die Frames.....	....	.30	.40

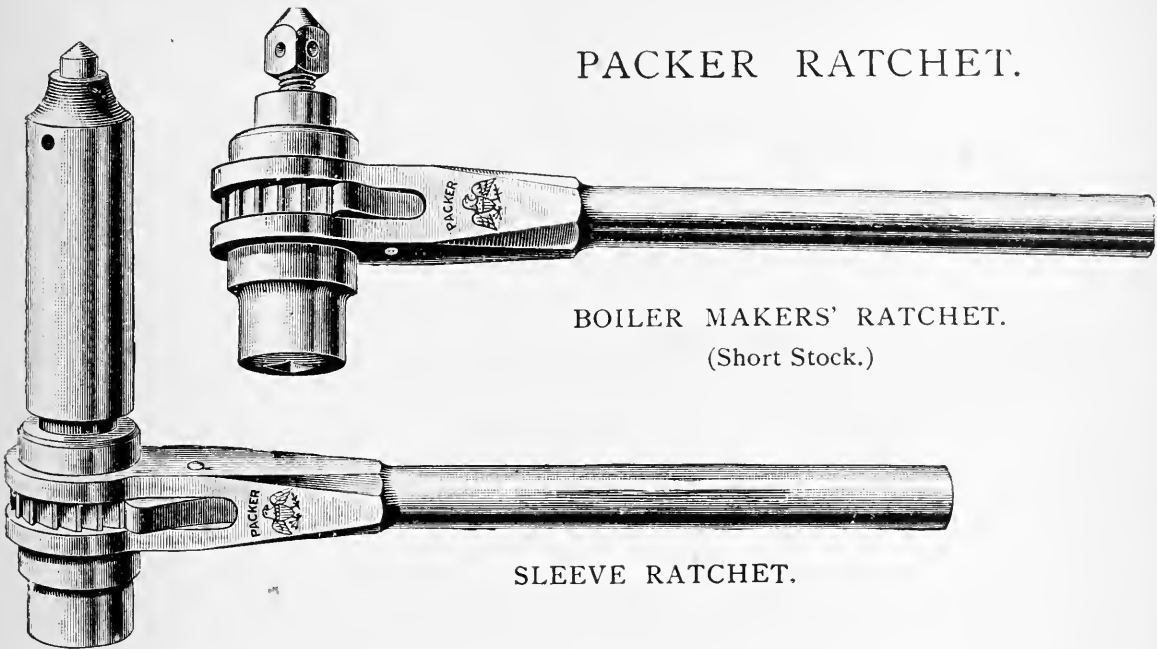
\* No. 1 Stock made with 1 in. Bushing extra.

Numbers.....	1¾	2	3
Pipe Sizes of Dies.....	1, 1¼, 1½.	1¼, 1½, 2.	2½, 3.
Dimensions of Dies.....	3 x ¾	4 x 1	5 x 1¼
Complete with R. II. Dies.....	13.50	20.00	43.00
Stocks only.....	6.00	9.50	25.00
Extra Dies, Right or Left.....	2.50	3.50	9.00
Extra Guides.....	.45	.60	1.00
Die Frames.....	.40	.50	.60

PACKER RATCHET.

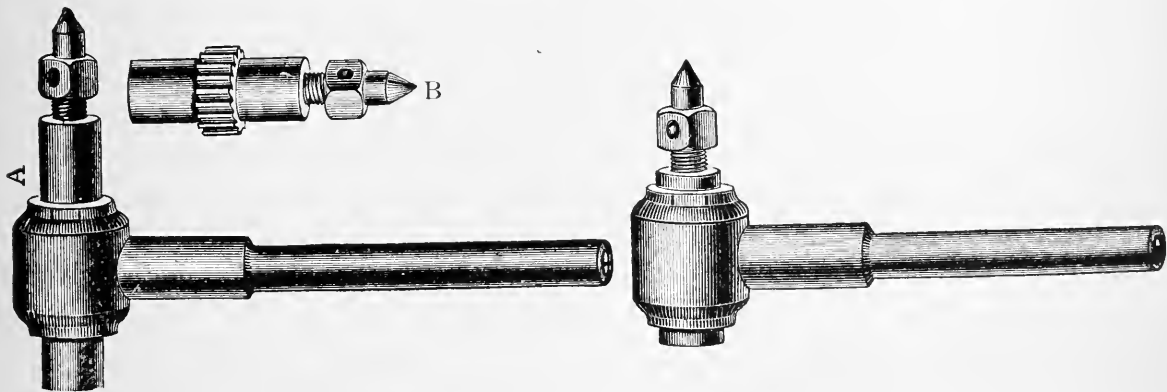
BOILER MAKERS' RATCHET.  
(Short Stock.)

SLEEVE RATCHET.



No. 1 Sleeve, 10 inch handle.....	\$10.50	No. 1 Boiler, 10 inch handle.....	\$9.00
No. 2    "    12    "    "    .....	13.50	No. 2    "    12    "    "    .....	10.50
No. 3    "    16    "    "    .....	16.00		
No. 4    "    18    "    "    .....	19.00		
No. 5    "    24    "    "    .....	23.00		

SMITH'S PATENT RATCHET.



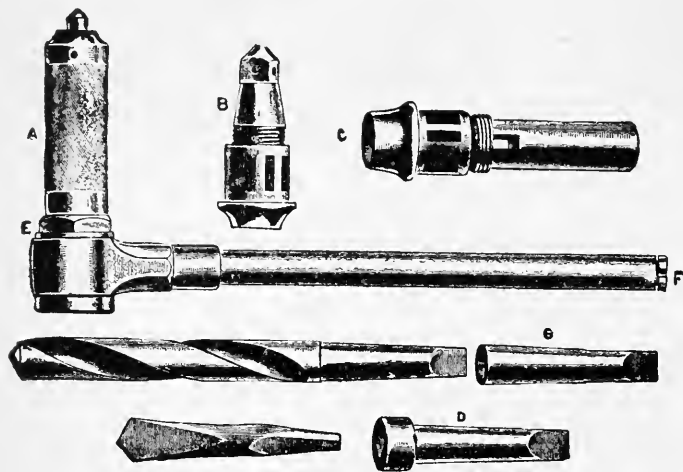
By removing the cap "A" the stock may be instantly removed, and the entire tool taken apart ; or, when a Boiler Ratchet is required, a short stock " B," as shown, can be substituted for the long one, and thus the necessity of having two Ratchets is avoided. The working parts being entirely enclosed, no dirt or chips can enter gears, and the tool can be kept thoroughly oiled at all times without fear of clogging up.

Each Ratchet is fitted with two Socket Bushings, one for square shank Drills and one round to fit shank of a No. 2 Morse Twist Drill.

No. 1, 12 inch Lever.....	\$13.50	BOILER RATCHETS.	
No. 2, 15    "    "    .....	16.00	No. 1, 12 inch Lever.....	\$9.00
No. 3, 18    "    "    .....	19.00	No. 2, 15    "    "    .....	10.50

Extra Short Stocks, for Boiler Work, for either 12 or 15 inch.....\$6.00

KEYSTONE RATCHET DRILL, REVERSIBLE.



Cut shows Ratchet Drill, adjusted, for square shank drills, cut "A"; also other parts for drilling purposes, all parts being interchangeable in holder. "C" represents socket for Morse taper shank drills, and "D" is a sleeve fitted to Morse taper socket and in which square shank drills may be used. "B" represents Boiler Makers' Drill for square shank. "F" indicates the knob for reversing the movement of ratchet. "E" indicates the cap by which the various sockets are held. The Feed Nut, shown in cut "A," is used also with Morse taper shank drill socket "C," and with which a novel and unique method is employed for dislodging the drill or sleeve from the socket.

		Square.		Morse Taper.	
No. 1	Ratchet Drill (10-inch handle), with Socket and Feed Nut.....		\$5.00		\$5.25
" 2	" " (14-inch " ), " " " .....		5.75		6.00
" 3	" " (16-inch " ), " " " .....		6.50		6.75
" 4	" " (18-22-inch " ), " " " .....		7.25		7.50
" 4	" " (24-inch " ), " " " .....		7.75		8.00
" 4	" " (28-inch " ), " " " .....		8.25		8.50

BOILER MAKERS' RATCHET, WITH SHORT SCREW FEED.

No. 1	(10-inch handle).....	\$5 00
" 2	(14-inch " ).....	5.75
" 3	(16-inch " ).....	6.50
" 4	(18-22 inch " ).....	7.25
" 4	(24-inch " ).....	7.75
" 4	(28-inch " ).....	8.25

Separate Parts.		No. 1.	No. 2.	No. 3.	No. 4.
Ratchet Holder ..		\$3.50	\$4.00	\$4.50	\$5 00
Socket for Square Shanks, with feed nut.....		1.50	1.75	2.00	2.25
		Takes No. 1 sleeve.	Takes No. 2 sleeve.	Takes No. 2 sleeve.	Takes No. 3 sleeve.
Socket for Morse Taper, with feed nut.....		1.75	2.00	2.25	2.50
Socket for Boiler Makers' Drill and feed screw.....		1.50	1.75	2.00	2.25
Feed Nut.....		.60	.75	.90	1.05
Square Shank Drill Sleeve.....		1.00	1.25	1.25	1.50
Morse Taper Shank Drill Sleeve .....		1.80	2.40	3.00	4 40

N. B.—All drill sockets interchangeable with holder either of socket wrench or stud driver.

RATCHET STUD DRIVER OR TAP WRENCH.

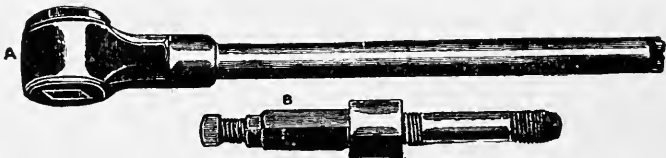
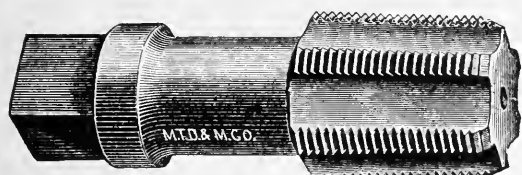


Illustration shows Tap Wrench or Ratchet Stud Driver, with nut socket adjusted, as cut "A." The square of hole in sockets measure: No. 1, 5/8 inch; No. 2, 3/4 inch; No. 3, 1 inch; No. 4, 1 1/4 inch. Cut "B" shows stud nut with stud.

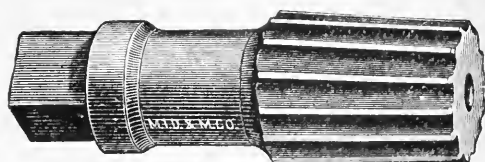
No. 1	Stud Driver (10-inch handle), with one Stud Nut.....	\$4.85
" 2	" " (14-inch " ), " " " .....	5.75
" 3	" " (16-inch " ), " " " .....	6.65
" 4	" " (18-22-inch " ), " " " .....	7.50
" 4	" " (24-inch " ), " " " .....	8 00
" 4	" " (28-inch " ), " " " .....	8.50

Separate Parts.		No. 1.	No. 2.	No. 3.	No. 4.
Holder.....		\$3.50	\$4.00	\$4.50	\$5.00
Stud Socket.....		.75	1.00	1.25	1.50
Stud Nut .....		.60	.75	.90	1.00

NOTE.—In ordering Stud Nuts, state size of studs for which nuts are required.  
N. B.—Stud Driver Sockets. interchangeable, in holder of Ratchet Drill.



PIPE TAP.



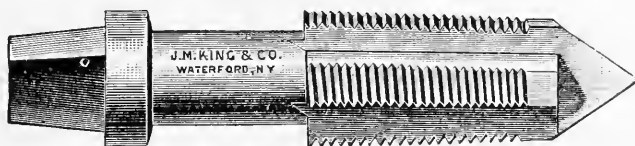
PIPE REAMER.

TAPS.

Diameter.....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Price.....	\$1.12	1.25	1.50	1.87	2.50	3.12	3.75	4.62	6.25	10.50	15.00	42.00	50.00
Threads per in.	27	18	18	14	14	11 1/2	11 1/2	11 1/2	11 1/2	8	8	---	---

REAMERS.

Diameter.....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Price.....	\$1.12	1.25	1.50	1.87	2.50	3.12	3.75	4.62	6.25	10.50	15.00



HUMPHREY COMBINED DRILL, REAMER AND TAP.

Diameter.....	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Price.....	\$2.50	2.50	3.00	4.50	6.00	7.25	8.50	10.75

FLAT AND PIPE DRILLS.



FLAT DRILLS.

Sizes, 6 in. long....	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 3/4	2	2 1/2
Each.....	.40	.40	.40	.40	.40	.45	.45	.45	.50	.55	.60	.65	.75	1.00	1.00

PIPE DRILLS.

Sizes.....	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Each.....	.91	.91	.95	.98	1.04	1.14	1.23	1.35	1.56	1.80	3.25

MACHINISTS' HAND TAPS.

V, U. S. OR WHITWORTH SHAPE OR THREAD.

Unless advised to the contrary, we fill orders with

V Threads



TAPER TAP



PLUG TAP.



BOTTOMING TAP.

SIZE.	WHOLE LENGTH.	LENGTH THREAD.	No. V THREADS TO INCH.	PRICE EACH.	PRICE PER SET OF 3 TAPS
1/4	2 1/8	1 1/8	16, 18, 20	\$0.45	\$1.35
5/16	2 3/8	1 3/8	16, 18	.50	1.50
3/8	3 1/8	1 3/4	14, 16, 18	.55	1.65
7/16	3 5/8	1 3/4	12, 14, 16	.60	1.80
1/2	4 1/8	1 3/4	12, 13, 14	.70	2.10
9/16	4 3/4	1 7/8	12, 14	.80	2.40
5/8	4 3/4	2	10, 11, 12	.90	2.70
11/16	5 1/8	2 1/8	11, 12	1.05	3.15
3/4	5 3/8	2 1/4	10, 11, 12	1.20	3.60
13/16	5 3/8	2 3/8	10	1.40	4.20
7/8	6	2 1/2	9, 10	1.60	4.80
15/16	6 1/8	2 5/8	9	1.80	5.40
1	6 1/2	2 7/8	8	2.00	6.00
1 1/8	6 5/8	3	7, 8	2.25	6.75
1 1/4	6 3/4	3 1/4	7	2.60	7.80
1 3/8	7 1/4	3 1/2	6	3.00	9.00
1 1/2	7 5/8	3 3/4	6	3.50	10.50
1 5/8	8 1/8	3 1/2	5, 5 1/2	4.20	12.60
1 3/4	8 1/8	4 1/8	5	5.00	15.00
1 7/8	9 1/8	4 1/4	4 1/2, 5	5.80	17.40
2	9 3/4	4 1/2	4 1/2	6.70	20.10

Left hand Taps, regular sizes as above, same list prices as right hand.

MORSE TWIST DRILLS.



TAPER SHANK.



STRAIGHT SHANK.



TAPER SQUARE SHANK DRILLS FITTING RATCHETS.

PRICE WITH TAPER OR STRAIGHT SHANKS.

Diam.	Price Each.	Length.	Socket for Morse Taper.
1/4	\$0.60	6 1/8	No. 1, \$1.20.
3/8	.65	6 1/4	
1/2	.70	6 3/8	
5/8	.75	6 1/2	
3/4	.80	6 3/4	
7/8	.85	7	
1	.90	7 1/4	
1 1/8	.95	7 1/2	
1 1/4	1.00	7 3/4	
1 1/2	1.10	8	
1 3/4	1.20	8 1/4	No. 2, \$1.80.
1 7/8	1.30	8 1/2	
2	1.40	8 3/4	
2 1/8	1.50	9	
2 1/4	1.60	9 1/4	
2 1/2	1.70	9 1/2	
2 3/4	1.85	9 3/4	
3	2.00	9 7/8	
3 1/8	2.15	10	
3 1/4	2.30	10 1/4	
3 1/2	2.45	10 1/2	No. 3, \$2.50.
3 3/4	2.60	10 3/8	
4	2.75	10 3/4	
4 1/8	2.90	10 7/8	
4 1/4	3.00	11	
4 1/2	3.20	11 1/8	
4 3/4	3.40	11 1/4	
5	3.60	11 1/2	
5 1/8	3.80	11 3/4	
5 1/4	4.00	11 7/8	
5 1/2	4.20	12	No. 4, \$4.00.
5 3/4	4.40	12 1/8	
6	4.50	12 1/2	
6 1/8	4.65	14 1/8	
6 1/4	4.80	14 1/4	
6 1/2	5.00	14 1/2	
6 3/4	5.20	14 3/8	
7	5.40	14 3/4	
7 1/8	5.60	14 7/8	
7 1/4	5.80	14 7/8	
7 1/2	6.00	15	
7 3/4	6.30	15 1/8	
8	6.60	15 1/4	
8 1/8	6.90	15 3/8	
8 1/4	7.20	15 1/2	
8 1/2	7.50	15 3/4	
8 3/4	7.80	15 7/8	
9	8.10	15 7/8	
9 1/8	8.40	16	
9 1/4	8.60	16 1/8	
9 1/2	8.80	16 1/4	
9 3/4	9.00	16 3/8	
10	9.20	16 1/2	
10 1/8	9.35	16 1/2	
10 1/4	9.50	16 1/2	
10 1/2	9.65	16 1/2	
10 3/4	9.80	16 1/2	
11			
11 1/8			
11 1/4			

PRICE WITH SQUARE SHANKS.  
3/8 in. by 3/8 in. and 1 1/2 in. long, and Shanks 3/4 in. by 1/2 in. and 1 3/4 in. long.

Diam.	Price.	Length.	Diam.	Price.	Length.	Diam.	Price.	Length.
1/4 in.	\$1.00	5 in.	9/16 in.	\$1.35	6 1/2 in.	1 1/8 in.	\$3.10	9 in.
3/8 "	1.05	5 "	5/8 "	1.40	6 1/2 "	1 1/8 "	3.35	9 "
1/2 "	1.10	5 "	11/16 "	1.45	6 1/2 "	1 1/4 "	3.65	9 "
5/8 "	1.15	5 "	3/4 "	1.55	6 1/2 "	1 5/8 "	3.90	9 "
3/4 "	1.20	6 "	13/16 "	1.75	7 "	1 7/8 "	4.20	9 "
7/8 "	1.25	6 1/4 "	7/8 "	2.05	7 1/2 "	1 7/8 "	4.50	9 "
1 "	1.25	6 1/4 "	15/16 "	2.30	8 "	1 1/2 "	4.80	9 "
1 1/8 "	1.30	6 1/4 "	1 "	2.55	8 1/2 "			
1 1/4 "	1.30	6 1/2 "	1 1/16 "	2.85	9 "			

Parties ordering Taper Square Shank Drills will please furnish drawings showing the square of the Shank and its length, and the full length of the Drills.

PRICES OF DRILLS PER SET.

No. 1.	Set of Taper Shank Drills, 1/4 to 1 in. varying by 16ths....	\$ 20.00
No. 2.	Set of Taper Shank Drills, 3/8 to 1 1/4 in. varying by 16ths....	34.50
No. 3.	Set of Taper Shank Drills, 3/8 to 3/4 in. by 32ds, 1 1/8 to 1 1/4 in. by 16ths.....	42.00
No. 4.	Set of Taper Shank Drills, 3/8 to 3/4 in. by 32ds, 1 1/8 to 1 1/2 in. by 16ths.....	\$64.00
	1 1/2 to 2 in. by 16ths.....	67.00
No. 5.	Set Drills, Straight Shanks, 1/8 to 1/2 in. by 64ths, mounted,.....	10.00
No. 6.	Set Drills, Straight Shanks, 1/8 to 1/2 in. by 32ds, mounted,.....	5.40
No. 7.	Set Drills, from 60 to 3/8 in., mounted.....	9.90
No. 8.	Set Drills, Steel Wire Gauge, from No. 1 to 60, mounted....	8.10
No. 9.	Half Set Drills, alternate Nos. from 1 to 59, mounted....	4.30
No. 11.	Set of Taper Shank Drills 3/8 to 1 1/2 in. by 32ds.....	\$107.50
	1 1/2 to 2 in. by 32ds.....	132.50
		240.00

STEEL SOCKETS FOR TAPER SHANK DRILLS.



Taper Socket.

Number.....	1	2	3	4	5
Each.....	\$1.20	1.80	2.50	4.00	7.50
Holds Drills... ..	1/4 to 1 1/8	5/8 to 3/2	1 1/8 to 1 1/4	1 3/4 to 2	2 1/8 to 3

STEEL SOCKETS FOR TAPER SHANK DRILLS.



Number.....	1	2	3	4
Each.....	\$2.00	2.50	3.20	4.80
Shank fitted to Sockets No.....	2 or 3	3	4	5

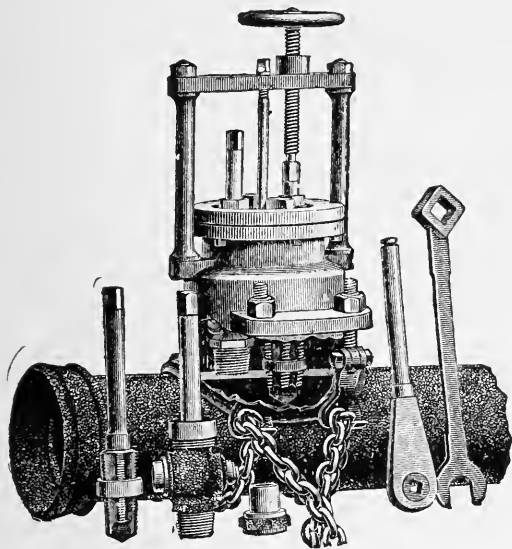
STEEL SLEEVES FOR TAPER SHANK DRILLS.



Number.....	1	2	3	4
Each.....	\$1.80	2.40	3.00	4.40
Fitted to Socket No.....	2 or 3	3	4	5

# THE HALL TAPPING MACHINE.

FOR TAPPING WATER OR GAS MAINS  
UNDER PRESSURE.



This machine is simple, durable, strong, well made, free from valves and complications, and all parts are interchangeable. It will stand any pressure and take almost any style of service cock, avoiding the necessity of using a special make and having the usefulness of the machine depend upon the supply at hand.

One machine taps sizes from  $\frac{1}{2}$  to  $1\frac{1}{4}$  inches and can be used equally well on mains of any size from 4 to 24 inch by simply changing the rubber form which is placed between the machine and main.

Machine for  $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$  and 1 inch cocks, with Drill-Taps, Mandrels, Wrenches, Ratchet, and rubbers, for 4 to 16 inch mains.....\$80.00

## PRICE LIST OF PARTS.

Chains .....	\$1.25	Stuffing Box Nuts .....	\$0.75
Clutch Bolts .....	1.00	Brass Gaskets .....	1.00
Lug Bolts .....	.75	Leather Packing for Disc .....	.50
Follower or Cock Carrier .....	2.25	Pure Rubber Gaskets .....	2.25
Sockets or Bushings .....	1.25	Ratchet Wrench .....	4.00
Large Steel Wrench .....	1.25	Combination Drill and Tap, $\frac{1}{2}$ inch .....	2.00
Small " " .....	.75	" " " " $\frac{5}{8}$ " .....	2.50
Feed Screw .....	1.75	" " " " $\frac{3}{4}$ " .....	3.00
Cross Bar .....	2.25	" " " " 1 " .....	3.20
Revolving Brass Plate .....	4.00	" " " " $1\frac{1}{4}$ " .....	6.05

## CLIMAX RATCHET STOCK.

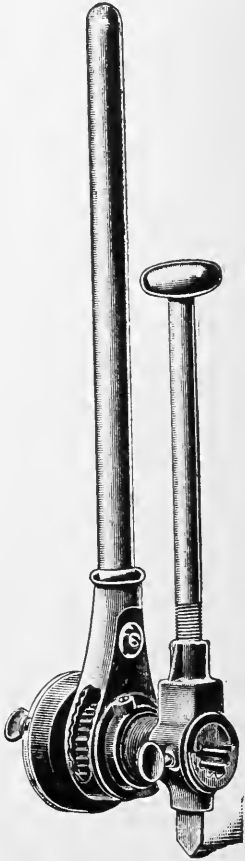
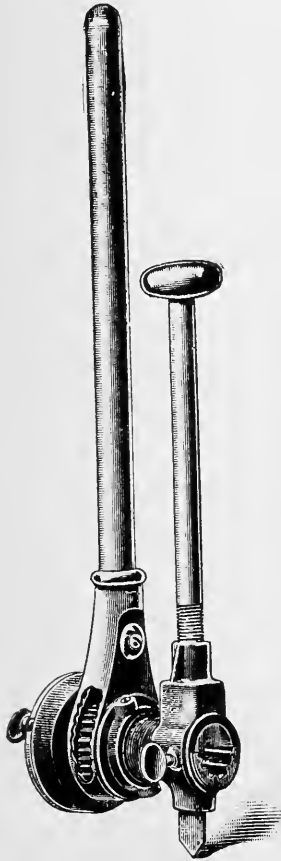
A PIPE STOCK WITH PIPE VISE ATTACHMENT.  
The great difficulty and inconvenience of threading iron pipe in ditches, under floors, in corners, overhead, &c., are so well known to all who have attempted it that a tool which will do this work quickly and conveniently will be promptly appreciated.

With this tool it is not necessary to dig up or take out whole lengths of pipe; the defective part of pipe can be cut out and the threads cut on the pieces in the ground with the greatest ease and convenience, not only saving time, but avoiding much unnecessary and disagreeable work.

OPERATION.—Slip the tool on the pipe to be threaded until the end of the pipe comes in contact with the die, then screw up the Vise handle, at the end of which is a strong vise to grip firmly the pipe, and rotate the ratchet-handle, which revolves the die and by means of the leading thread carries the die on the pipe, producing a true thread; after cutting the thread, by reversing the pawl and moving the handle reversely the die runs off the pipe.

No. 1 Threads $\frac{1}{4}$ to 1 inch Pipe, takes Die	
2, $2\frac{3}{8}$ and $2\frac{1}{2}$ inches square .....	\$10.00
No. 2 Threads 1 to 2 inch Pipe, takes Die	
$2\frac{3}{8}$ , $2\frac{1}{2}$ , 3, $3\frac{7}{8}$ and 4 inches square .....	17.00
Pipe Dies, $2\frac{3}{8}$ inches square .....	2.00
" " $3\frac{7}{8}$ " " .....	3.50

This stock is attractively finished in Nickel and Japan, and every one is shipped in a strong wooden box.





MACHINISTS' HAMMERS.

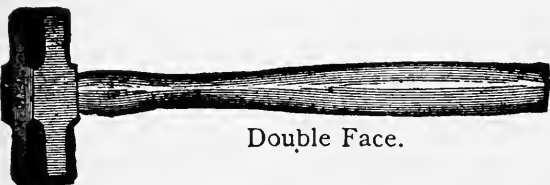


Ball Pene.



Straight Pene.

Number.....	0000	000	00	0	1	2	3	4	5	6	7	8
Price, per dozen..	12.00	12.00	12.00	12.50	13.50	14.50	15.50	16.50	17.50	19.00	20.50	22.00
Weight: {	lbs...	...	..	1	1	1	1	2	2	2	2	3
	oz....	6	8	12	..	4	8	12	..	4	8	12



Double Face.

ENGINEERS' HAMMERS.

Number.....	0	1	2	3	4
Price, per doz..	\$14.50	15.50	16.50	18.00	19.50
Weight: {	lbs.	1	2	2	3
	oz..	8	..	6	..

GAS FITTERS' AUGERS.

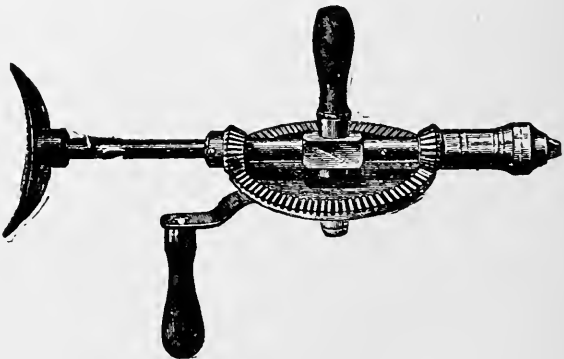


Size of Gas Pipe.....	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Size of Auger.....	5/8	3/4	7/8	1 1/4	1 1/2	1 3/4	2	2 1/2
Price.....	.80	1.00	1.12	1.60	1.92	2.25	2.50	3.25

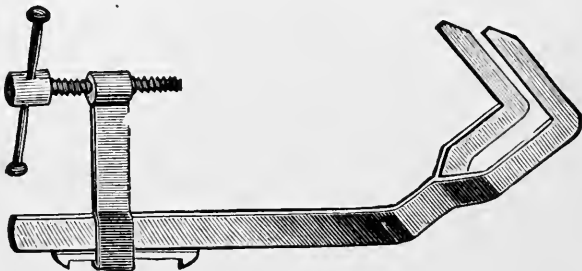
BREAST DRILL, No. 12.

This Drill has a Malleable Iron Stock, Japanned, Rosewood Handles, Polished and Plated Chuck, changeable Gears, one even and the other three to one. It has a Barber Improved Chuck with recent improvement which makes it hold perfectly tools of all shapes and sizes.

Each, 2.50.



CROW FOR DRILLING AND TAPPING.



Number .....	1	2	3
Size.....	holds Pipe from	1 1/2 to 3	1 1/2 to 12 in.
Each.....	10.00	13.00	16.00

FILES.—MILL AND ROUND.—Per Doz.

Inch.....	4	5	6	7	8	9	10	11	12
Bastard.....	\$ 3.00	3.20	3.50	3.90	4.30	4.90	5.60	6.70	7.50
Second Cut.....	3.50	3.80	4.00	4.60	4.90	5.80	6.40	7.80	8.60
Smooth.....	3.90	4.10	4.50	4.90	5.40	6.30	7.00	8.50	9.40
Inch.....	13	14	15	16	17	18	19	20	
Bastard.....	9.40	10.70	13.10	14.70	18.20	20.20	24.60	27.40	
Second Cut.....	10.70	12.20	15.00	16.80	20.20	22.70	27.50	30.70	
Smooth.....	11.70	13.10	16.10	17.90	21.70	24.30	29.40	32.90	

FLAT.—Per Doz.

Inch.....	4	5	6	7	8	9	10	11	12
Bastard.....	\$ 3.70	3.90	4.30	4.80	5.30	6.30	7.00	8.60	9.70
Second Cut.....	4.30	4.60	4.80	5.50	6.10	7.20	8.10	9.80	11.00
Smooth.....	4.70	4.90	5.30	6.10	6.60	7.90	8.70	10.70	12.10
Inch.....	13	14	15	16	17	18	19	20	
Bastard.....	11.80	13.30	16.00	17.80	21.50	23.90	28.40	31.50	
Second Cut.....	13.60	15.30	18.30	20.10	24.20	26.80	31.60	35.30	
Smooth.....	14.70	16.70	20.00	22.30	26.50	29.20	34.60	38.30	

HALF ROUND AND THREE SQUARE.—Per Doz.

Inch.....	4	5	6	7	8	9	10	11	12
Bastard.....	4.80	5.40	6.10	7.00	7.50	8.50	9.10	10.70	11.80
Second Cut.....	5.60	6.10	6.70	7.70	8.30	9.40	10.10	11.80	13.00
Smooth.....	6.10	6.40	7.10	8.20	8.90	9.90	10.70	12.70	13.90
Inch.....	13	14	15	16	17	18	19	20	
Bastard.....	14.10	15.50	18.50	20.60	24.70	27.50	32.80	36.20	
Second Cut.....	15.40	17.00	20.40	22.50	27.00	29.90	35.70	39.40	
Smooth.....	16.60	18.30	21.70	24.20	28.90	32.00	38.10	42.30	
Inch.....		3	3½	4	4½	5	5½	6	7
Tapers, Single Cut.....		\$2.10	2.10	2.20	2.40	2.60	3.00	3.40	4.30
“ Double “.....		2.50	2.50	2.90	3.10	3.50	4.00	4.70	5.60
Slim Tapers, Single Cut.....		2.10	2.10	2.20	2.30	2.50	2.90	3.10	3.80
“ Double “.....		2.50	2.50	2.60	3.00	3.20	3.50	3.90	4.50
Pitsaw Blunt, Single “.....		—	—	4.80	—	5.40	—	6.10	7.00
Hooktooth, “.....		—	—	—	—	—	—	6.70	7.70
Wood Rasps, Half Round.....		—	—	—	—	—	—	8.10	9.30
“ “ Flat.....		—	—	—	—	—	—	7.40	8.60
Inch.....		8	9	10	11	12	13	14	15
Tapers, Single Cut.....		\$5.40	6.60	8.10	10.70	12.50	15.90	18.20	—
“ Double “.....		6.70	8.10	9.70	12.10	14.70	17.50	20.60	—
Slim Tapers, Single Cut.....		4.50	5.40	6.40	8.30	9.50	12.10	13.80	—
“ Double “.....		5.30	6.30	7.50	9.10	11.00	13.10	15.40	—
Pitsaw Blunt, Single “.....		7.50	8.50	9.10	10.70	11.80	—	—	—
Hooktooth, “.....		8.30	9.40	10.10	11.80	13.00	—	—	—
Wood Rasp, Half Round.....		10.10	12.20	13.70	16.80	18.70	22.40	24.80	29.70
“ “ Flat.....		9.40	11.40	12.80	15.50	17.50	20.90	23.20	27.80

LOCKJAW FILE HANDLES.

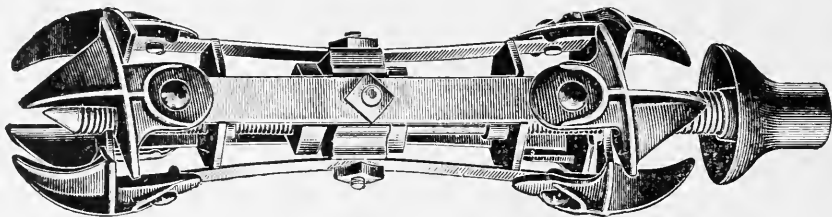
PER GROSS.

No. 1 for Files 13 inches and larger.....	\$6.00	No. 4½ for Files 4 to 7 inches.....	\$4.75
“ 2 “ 9 to 12 inches.....	5.50	“ 5 “ 2 “ 5 “.....	4.50
“ 3 “ 7 “ 10 “.....	5.25	Assorted Nos. 1 to 5.....	5.00
“ 4 “ 5 “ 8 “.....	5.00	No. 6 for Tinner's Soldering Coppers..	8.00

PLAIN FILE HANDLES.

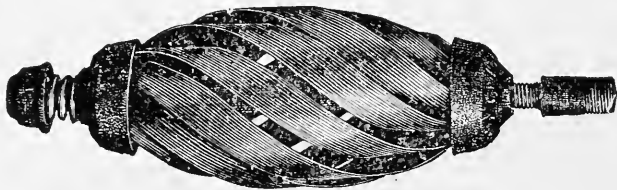
No. 1 Hardwood Polished, Brass Ferrules, assorted 4 sizes, per gross.....	\$4.00
“ 2 “ “ “ “ 3 large “ “.....	4.50
“ 3 “ “ Iron “ “ 4 “ “.....	4.00
“ 4 “ “ “ “ 3 large “ “.....	4.50
“ 7 Softwood Brass Ferrules, 4 sizes.....	3.25
“ 8 “ “ “ 3 large sizes.....	3.50
“ 9 “ Iron “ 4 sizes.....	3.25
“ 10 “ “ “ 3 large sizes.....	3.50

FLUE BRUSHES AND SCRAPERS.



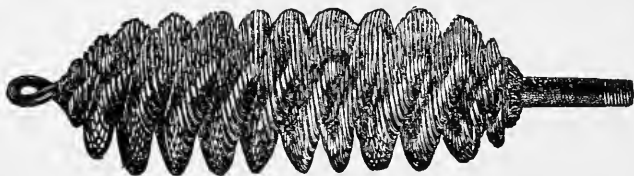
“Engineers’ Favorite.”

Size....	1¾	2	2¼	2½	2¾	3	3¼	3½	4	4½	5
Each...	2.00	2.00	2.25	2.50	2.75	3.00	3.25	3.50	4.00	4.50	6.25



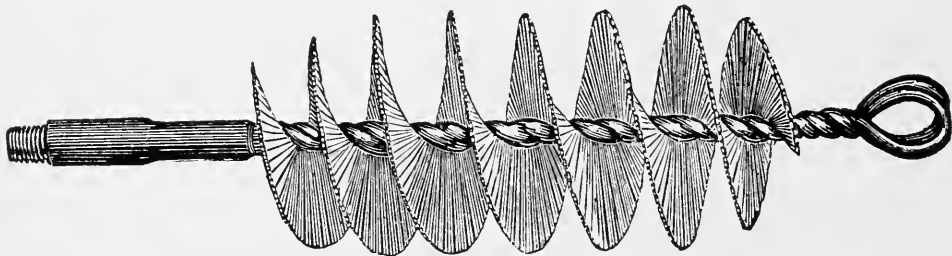
Christoffel’s Elliptical Scraper.

Size....	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Each...	2.00	2.00	2.00	2.00	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00



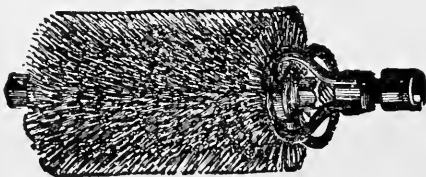
Christoffel’s Coil Tube Cleaner.

Size....	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Each...	1.00	1.00	1.00	1.00	1.10	1.20	1.30	1.40	1.50	1.65	1.75	1.90	2.00



Steel Wire Tube Brush.

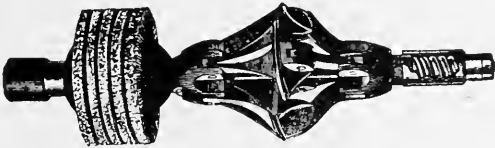
Size.....	1	1¼	1½	1¾	2	2¼	2½	2¾
Each.....	1.10	1.10	1.20	1.20	1.25	1.40	1.50	1.60
Size.....	3	3¼	3½	4	4½	5	6	7
Each.....	1.75	2.00	2.25	2.50	2.75	3.00	3.00	3.50



Spencer’s Steel Brush Tube Cleaner.

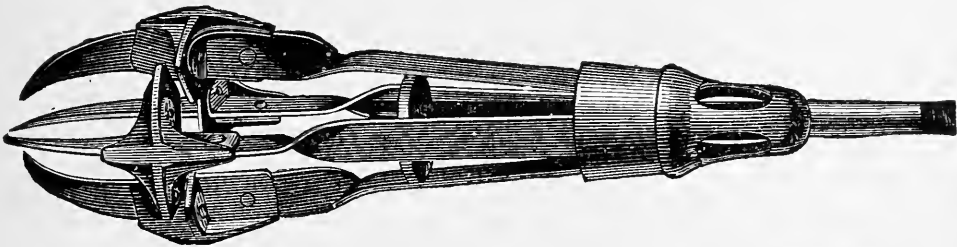
Size.....	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Each.....	2 00	2.25	2.50	2 75	3.00	3.25	3.50	3.75	4 00

INGALLS ADJUSTABLE TUBE SCRAPER.



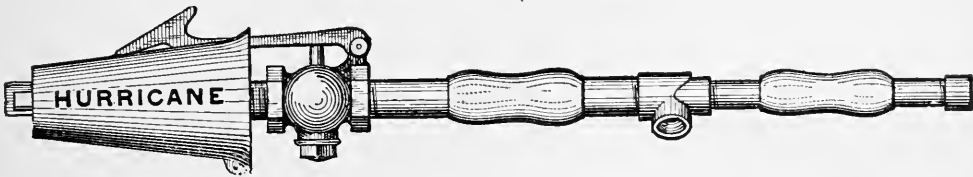
Size, Inches.....	2	2¼	2½	2¾	3	3¼	3½	4	4½	5	6
With Brush.....	\$3.00	3.40	3.75	4.15	4.50	4.90	5.25	6.00	6.75	7.50	9.00
Without Brush.....	2.00	2.25	2.50	2.75	3.00	3.25	3.50	4.00	4.50	5.00	6.00

NATIONAL STEEL TUBE CLEANER.



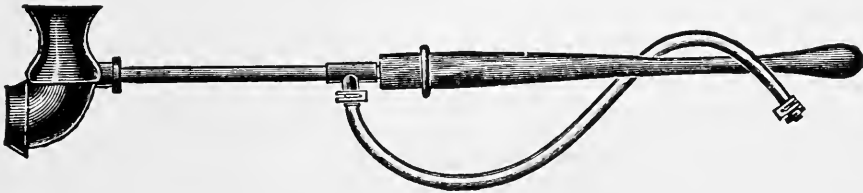
Size, Inches.....	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	4	4½	5	5½
Each.....	\$2.00	2.00	2.00	2.25	2.50	2.75	3.00	3.25	3.50	4.00	4.50	5.00	5.50

HURRICANE STEAM FLUE CLEANER.



A powerful and effective machine. Price, 3-inch, \$7.00 ; 4-inch, \$8.00.

THE "SOOT SUCKER."



Size Tube, in...	2	2½	3	3½	4	4½	5
Price.....	\$10.00	10.50	11.00	11.50	12.00	12.50	13.00

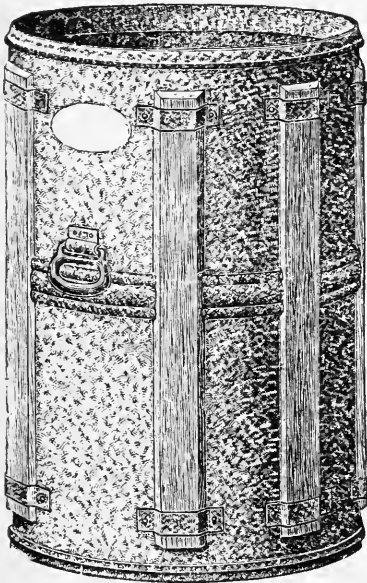
Handle and fittings, \$3.50, any size.

The Cleaner can be placed on the handle and fittings of any of the various blowers, or a straight piece of pipe, if desired.

GALVANIZED ASH CANS.

WITH EIGHT WOOD STRAPS.

No.....	7	8	9	10
Inches.....	15 x 26	17 x 26	18 x 26	20 x 26
Each.....	5.25	6.00	6.25	7.25



COVERS.

No.....	7	8	9	10
Price per doz...	8.50	9.50	10.00	10.50

WITHOUT STRAPS.

No.....	2½	3	4	5	6
Inches.....	14 x 19	15 x 26	17 x 26	18 x 26	20 x 26
Each.....	4.00	4.50	5.25	5.50	6.50

COVERS.

No.....	2½	3	4	5	6
Price per doz...	7 50	8.50	9.50	10.00	10.50

WITH HEAVY BAIL FOR HOISTING.

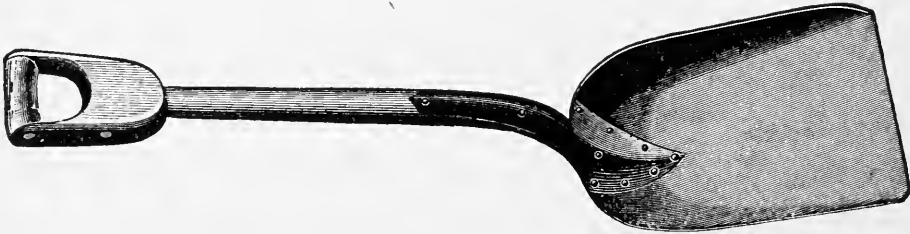
WITHOUT STRAPS.

No.....	250	300	400	500	600
Inches... ..	14 x 19	15 x 26	17 x 26	18 x 26	20 x 26
Each.....	5.50	6.50	7.25	7.50	8.50

WITH EIGHT WOOD STRAPS.

No.....	70	80	90	100
Inches.....	15 x 26	17 x 26	18 x 26	20 x 26
Each.....	7.25	8.00	8.25	9.25

STEEL SCOOPS.



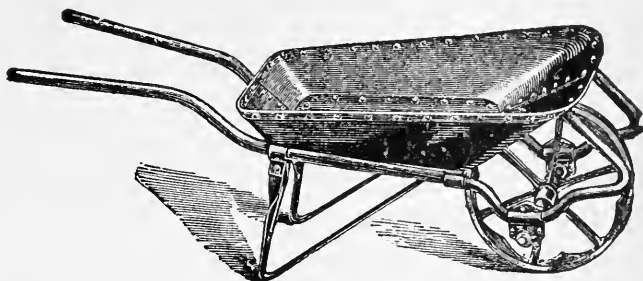
THE "AMES" STEEL SCOOPS.

No.....	2	3	4	5	6	7	8	9
Price, per doz.	\$21.75	22.12	22.88	23.25	24.00	24.75	25.50	26.63

THE "BEEKMAN" STEEL SCOOPS.

No.....	2	3	4	5	6	7	8	9
Price, per doz.	\$17.10	17.55	18.00	18.45	18.90	20.70	21.15	21.60

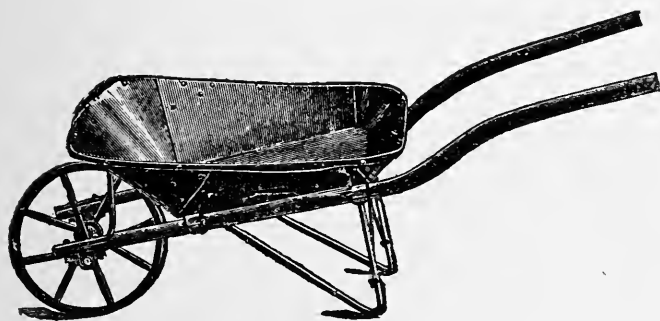
## PATENTED COAL BARROWS.



No. 4.—Greatest Width of Tray, 29 inches.	Capacity, 150 lbs. of Coal.	
Tray of Nos. 16 and 12 Steel.....		\$12.25
No. 5.—Greatest Width of Tray, 31½ inches.	Capacity, 200 lbs. of Coal.	
Tray of Nos. 16 and 12 Steel.....		14.25
No. 6.—Greatest Width of Tray, 32 inches.	Capacity, 225 lbs. of Coal.	
Tray of Nos. 16 and 12 Steel.....		15.00
No. 7.—Greatest Width of Tray, 36 inches.	Capacity, 300 lbs. of Coal.	
Tray of Nos. 16 and 12 Steel.....		18.00
No. 8.—Greatest Width of Tray, 40 inches.	Capacity, 450 lbs. of Coal.	
Tray of Nos. 16 and 12 Steel.....		20.00

TRAYS ONLY.....No.	4	5	6	7	8
	\$4.00	4.75	5.25	6.25	7.00

Bottoms thicker than sides. Sizes and capacities as above numbers.



### “THE IDEAL.”

No. 4.—Greatest width of Tray, 29 in.; greatest length, 32 in.; capacity, 3 cubic feet; 15 in. wheel; Tray of No. 16 Steel.....\$10.00

These Barrows can be made with the Tubular Handles passing around the wheel.

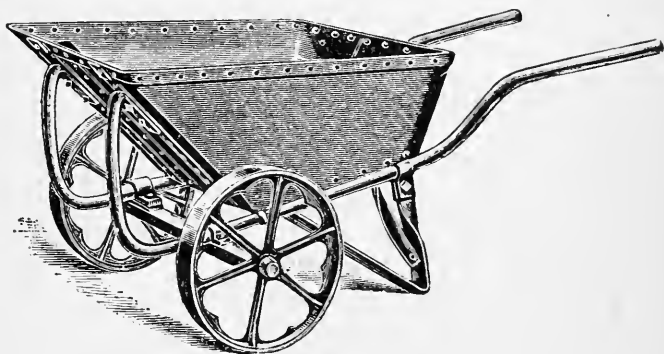
## PATENTED COAL BARROWS.

Square Trays. With Two Wheels.

Our Coal Barrows, numbered 4 to 8 inclusive, can be furnished with two wheels.

The following lists contain the sizes more commonly made in this way.

No. 9½	Capacity 260 lbs	-----	\$28.00
“ 10½	“ 340 “	-----	30.00
“ 11½	“ 400 “	-----	32.00
“ 12½	“ 480 “	-----	34.00
“ 13½	“ 600 “	-----	38.00

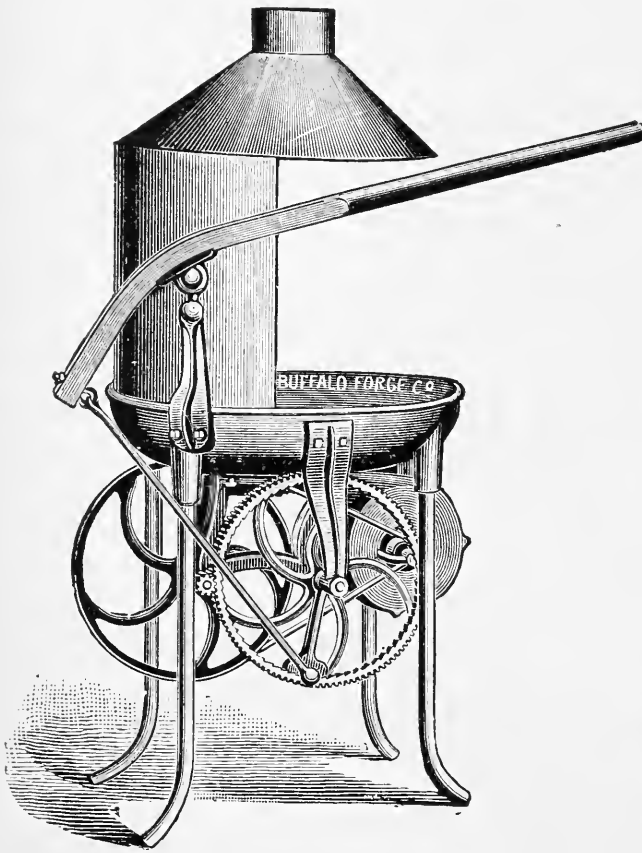


Our Patented Two-Wheeled Coal Barrows are also made in the A (of Nos. 12 and 10 steel) and AA (of Nos. 12 and 8 steel) styles, of the same sizes and capacity as the preceding, as follows:

No. 9½A	Capacity 260 lbs	-----	\$29.50	No. 9½AA	Capacity 260 lbs	-----	\$30.50
“ 10½A	“ 340 “	-----	31.50	“ 10½AA	“ 340 “	-----	32.75
“ 11½A	“ 400 “	-----	33.50	“ 11½AA	“ 400 “	-----	34.50
“ 12½A	“ 480 “	-----	35.75	“ 12½AA	“ 480 “	-----	36.75
“ 13½A	“ 600 “	-----	40.00	“ 13½AA	“ 600 “	-----	42.00

These Barrows can be furnished with one wheel. All parts are interchangeable.

## BUFFALO PORTABLE FORGES.

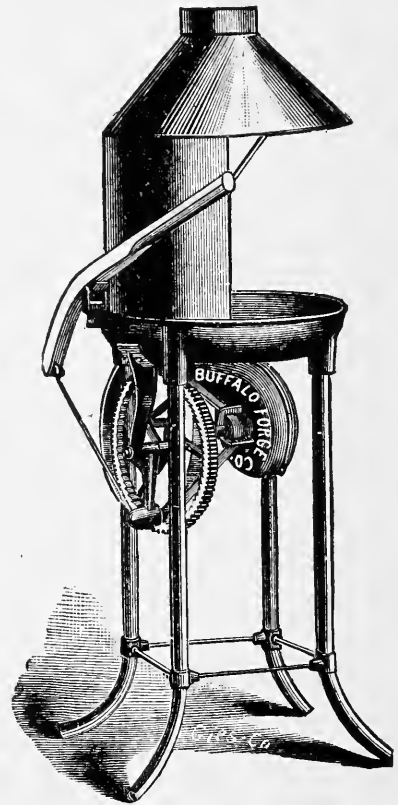


FORGE No. 1.

The forges with closed hoods are strongly made of sheet iron, completely enclosing the fire-place, and are fitted with a large sliding door in front and small one in rear, for manipulating fire, etc. Thus equipped, the escape of sparks, fumes and smoke is prevented, and adapts them for use in annealing and refining metals, and in planing mills, furniture factories, saw-mills, oil refineries, sugar works, etc.

Half open hood; height, 29 inches; fan, 10 inches; hearth, 21 x 27 inches; weight 140 pounds.

Price, - \$40.00



FORGE No. 4.

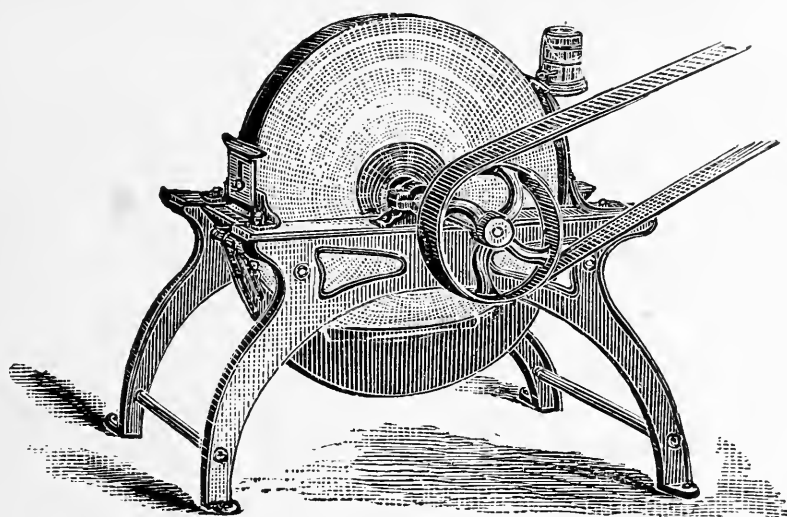
No. 4 will produce a welding heat on iron  $1\frac{1}{2}$  in. in diameter in 5 minutes, and do heavier work if required; but on account of size of fireplace and general capacity, is specially recommended for use of die sinkers, model and tool makers, plumbers, tinsmiths, jewelers, dentists, locksmiths and small hardware manufacturers, for heating and tempering tools of all kinds.

Half-open hood; height, 33 inches; size of hearth, 18 inches diameter; weight 75 pounds.

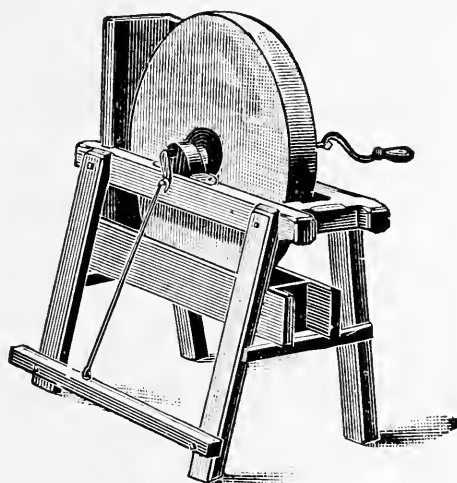
Price, - \$27.00



# HAND AND POWER GRIND STONES.



30 inch, Heavy	\$26.00	36 inch, Heavy	\$40.00
Shield and Water Bucket, \$2.00 extra.			
25 inch	\$14.00	Shield and Water Bucket, \$1.50 extra.	
30 inch, Light			\$22.50
Mounted on Iron Frames, for Power.			



Mounted on Heavy Hardwood Frames.

HAND OR FOOT POWER.

50 lbs., 18 inch diameter, each			\$5.50
60 " 20 " " "			5.75
80 " 22 " " "			6.25
100 " 24 " " "			7.00
120 " 26 " " "			7.50
140 " 28 " " "			8.00
160 " 30 " x 2½ to 3 in. "			8.75
225 " 30 " x 4 inch, "			11.00
325 " 36 " x 4 inch, "			15.00

Knocked down for export when required.

YALE-WESTON TRIPLEX CHAIN HOIST.

This is without question the most efficient block now made. 80 per cent. of applied power is utilized in lifting the load.

TRIPLE POWER.

TRIPLE SPEED.

TRIPLE DURABILITY.



Direct Form without Lower Block. 1 to 2 Tons.

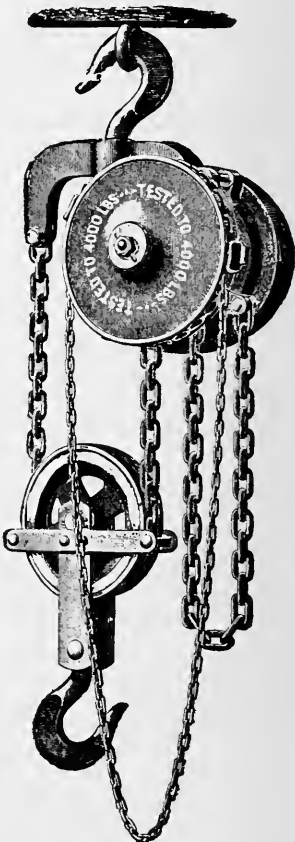
This means that in this block *only 20 per cent.* of the operator's labor is wasted in overcoming friction.

INCREASED WEARING SURFACE,

SUBDIVISION OF STRAINS,

LOAD ACCURATELY EQUALIZED,

among the great advantages obtained in this block.



Type A with One Upper Hook. 3 to 10 Tons.

CAPACITY. In Tons	Price Complete.	*Hoist in Feet	Extra Hoist Price Per Foot.	Minimum Distance be- tween Hooks in inches.	† Reach.	Net Weight in Lbs.	# CHAIN PULL.	
							Pounds.	Feet.
1/2	\$35.00	8	\$0.90	15	9'-3"	51	62	21
1	45.00	8	.95	17	9'-5"	89	82	31
1 1/2	60.00	8	1.00	19 1/2	9'-7 1/2"	133	110	35
2	70.00	9	1.05	24	11'-0"	203	120	42
3	90.00	10	1.50	32	12'-8"	206	114	69
4	110.00	10	1.60	37	13'-1"	307	124	84
5	140.00	12	2.15	45	15'-9"	397	110	126
6	165.00	12	2.15	46	15'-10"	417	130	126
8	200.00	12	2.70	51	16'-3"	505	135	168
10	240.00	12	3.25	57	16'-9"	622	140	210

\* NOTE. - Figures denote height in feet which blocks, with regular lengths of chain, will hoist from level on which operator stands.

# THE YALE-WESTON DIFFERENTIAL BLOCK



This is the most simple form of Chain Block on the Market ; is  
a powerful hoist, designed particularly for general  
and rough usage.

Capacity in Tons.	Price Complete.	*Hoist in Feet.	†Extra Hoist Price per Foot.	Minimum Distance between Hooks.	Net Weight in Lbs.	‡Chain Pull.	
						Pounds.	Feet.
1/8	\$18.00	5	\$2.80	16 in.	11	35	15
1/4	18.00	6	2.80	17 in.	22	72	18
1/2	21.00	7	2.80	21 in.	30	122	24
1	28.00	8	3.00	26 in.	51	216	30
1 1/2	36.00	8 1/2	3.20	32 in.	81	246	36
2	45.00	9	3.40	39 in.	122	308	42
3	60.00	9 1/2	4.00	44 in.	180	557	38

\* Figures denote height in feet which blocks, with regular lengths of chain, will hoist above level on which operator stands.

† Each additional foot of hoist requires 4 feet of additional chain.

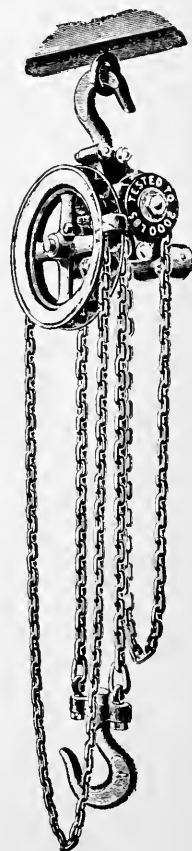
‡ Figures denote the pull in pounds required to lift the full load, and the number of feet of chain which must be handled to lift the load one foot.

# YALE DUPLEX CONVERTIBLE SCREW BLOCK.

In this block is found the latest improvements of the  
Screw hoist.

HIGHEST EFFICIENCY, ABSOLUTE SECURITY,  
CONVERTIBLE

to dispatch lowering. Lightest weight hoist of  
the screw type on the market.



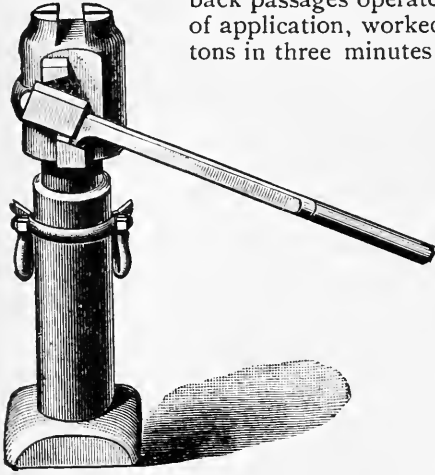
Capacity in Tons.	Price Complete.	*Hoist in Feet.	Extra Hoist Price per Foot.	Minimum Distance between Hooks.	Net Weight in Lbs.	‡ Chain Pull.	
						Lbs.	Feet.
1/2	\$25.00	8	\$1.25	13 in.	43	68	40
1	30.00	8	1.30	16 in.	57	87	59
1 1/2	40.00	8	1.35	19 in.	76	94	80
2	50.00	9	1.40	21 in.	104	115	93
3	70.00	10	1.50	25 in.	200	132	126
3 1/2	80.00	10	1.90	26 in.	210	140	138
4	95.00	10	1.95	29 in.	225	142	155
5	125.00	12	2.00	31 in.	340	145	195
6	150.00	12	2.80	33 in.	360	145	252
7	175.00	12	3.00	34 in.	370	160	275
8	200.00	12	3.10	36 in.	390	160	310
10	250.00	12	3.20	45 in.	570	160	390

\* Figures denote height in feet which blocks, with regular lengths of chain, will hoist from level on which operator stands.

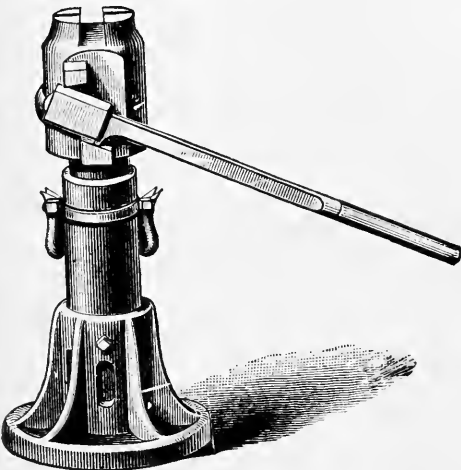
‡ Figures denote the pull in pounds required to lift the full load and the number of feet of hand chain which must be handled to lift the load one foot.

## DUDGEON'S LATEST IMPROVED HYDRAULIC JACKS.

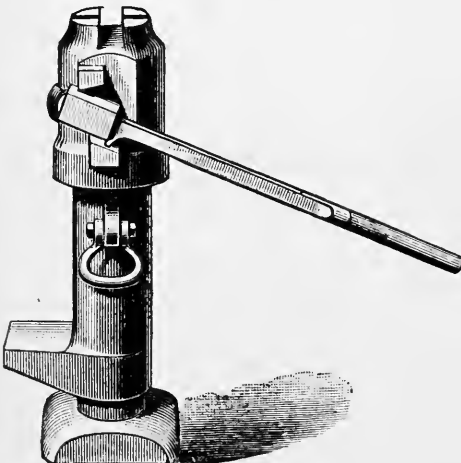
This Jack appears to the eye when depressed a simple Cylinder, with a Base and Head, when elevated one Cylinder sliding within another. To the inner one (which is termed the Ram) is attached the Head having a Socket to receive the Lever which operates the Force Pump in the lower end of Ram; the remaining space is the reservoir containing the liquid which when forced into the lower chamber causes the Ram to rise, and to lower, when allowed to return through the lower valve and back passages operated by the same lever. These Jacks are light, portable and easy of application, worked by one man who can lift 10 tons, 1 foot in  $1\frac{1}{2}$  minutes or 20 tons in three minutes and so on proportionately.



PLAIN JACK.



BASE JACK.



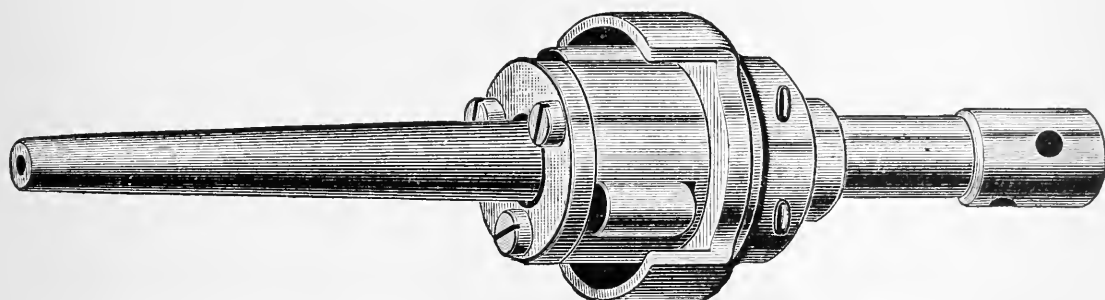
CLAW OR GROUND LIFTING JACK.

Tons Lift.	Run out.	Height.	Size Bottom.	Weight.	Price.
4	12	24	4 sq.	46	\$60
4	24	37	" "	60	65
7	12	25	4½ " "	64	70
7	18	32	" "	72	73
7	24	38	" "	80	75
10	12	25	6 " "	80	80
10	18	32	" "	98	95
10	24	39	" "	110	110
15	12	26	6½ " "	102	100
15	18	32	" "	120	125
15	24	39	" "	140	150
20	12	26	7 " "	127	120
20	18	33	" "	155	145
20	24	39	" "	180	170
30	9	22	8 rd.	146	150
30	12	26	" "	194	175
30	18	33	" "	260	210
40	12	27	9 " "	280	210
40	18	34	" "	320	250
4	12	23	9½ rd.	61	\$60
4	24	37	" "	80	65
7	12	25	10 " "	82	80
7	18	31	" "	100	85
7	24	38	" "	120	90
10	12	25	11 " "	109	95
10	18	31	" "	125	110
10	24	39	" "	145	125
15	12	25	12 " "	135	125
15	18	32	" "	158	150
15	24	39	" "	176	175
20	12	26	13 " "	169	150
20	18	33	" "	198	175
20	24	39	" "	228	200
30	9	22	14 " "	210	170
30	12	26	" "	259	200
30	18	33	" "	300	235
40	12	27	14½ " "	320	240
40	18	33	" "	360	280
4	12	24	4 sq.	64	\$60
4	24	37	" "	94	65
7	12	25	4½ " "	90	85
7	18	31	" "	110	88
7	24	38	" "	123	90
10	12	25	6 " "	123	100
10	18	32	" "	144	120
10	24	39	" "	170	145
15	12	26	6½ " "	162	150
15	18	32	" "	189	185
20	12	26	7 " "	207	200
20	18	33	" "	245	240
30	12	26	8 rd.	310	250

SPECIAL SIZES TO ORDER.

The ground lifting attachment is a tube screwed into the underside of the head, on the lower end is a claw to support the weight to be raised.

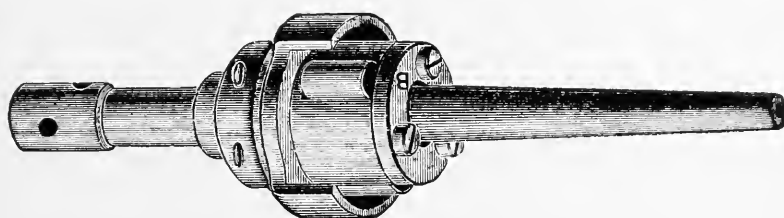
# TUBE EXPANDERS.



THE DUDGEON IMPROVED TUBE EXPANDER.

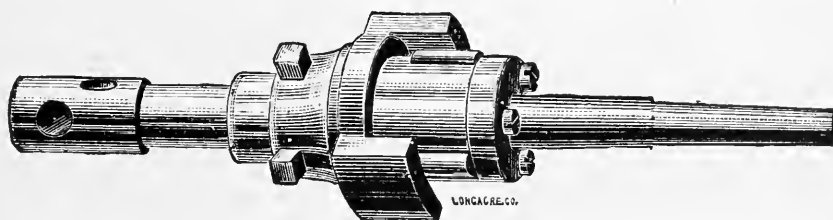
Will expand two sizes up to 2-inch and three sizes above.

1 <sup>5</sup> / <sub>8</sub> and 1 <sup>3</sup> / <sub>4</sub> in .....	\$20.00	3 <sup>1</sup> / <sub>2</sub> , 3 <sup>5</sup> / <sub>8</sub> and 3 <sup>3</sup> / <sub>4</sub> in .....	\$70.00
1 <sup>3</sup> / <sub>4</sub> and 1 <sup>7</sup> / <sub>8</sub> in .....	20.00	3 <sup>3</sup> / <sub>4</sub> , 3 <sup>7</sup> / <sub>8</sub> and 4 in .....	75.00
1 <sup>7</sup> / <sub>8</sub> and 2 in .....	25.00	4, 4 <sup>1</sup> / <sub>8</sub> and 4 <sup>1</sup> / <sub>4</sub> in .....	80.00
2, 2 <sup>1</sup> / <sub>8</sub> and 2 <sup>1</sup> / <sub>4</sub> in .....	30.00	4 <sup>1</sup> / <sub>4</sub> , 4 <sup>3</sup> / <sub>8</sub> and 4 <sup>1</sup> / <sub>2</sub> in .....	85.00
2 <sup>1</sup> / <sub>4</sub> , 2 <sup>3</sup> / <sub>8</sub> and 2 <sup>1</sup> / <sub>2</sub> in .....	36.00	4 <sup>1</sup> / <sub>2</sub> , 4 <sup>5</sup> / <sub>8</sub> and 4 <sup>3</sup> / <sub>4</sub> in .....	85.00
2 <sup>1</sup> / <sub>2</sub> , 2 <sup>5</sup> / <sub>8</sub> and 2 <sup>3</sup> / <sub>4</sub> in .....	39.00	4 <sup>3</sup> / <sub>4</sub> , 4 <sup>7</sup> / <sub>8</sub> and 5 in .....	90.00
2 <sup>3</sup> / <sub>4</sub> , 2 <sup>7</sup> / <sub>8</sub> and 3 in .....	45.00	5, 5 <sup>1</sup> / <sub>4</sub> and 5 <sup>1</sup> / <sub>2</sub> in .....	100.00
3, 3 <sup>1</sup> / <sub>8</sub> and 3 <sup>1</sup> / <sub>4</sub> in .....	52.00	5 <sup>1</sup> / <sub>2</sub> , 5 <sup>3</sup> / <sub>4</sub> and 6 in .....	105.00
3 <sup>1</sup> / <sub>4</sub> , 3 <sup>3</sup> / <sub>8</sub> and 3 <sup>1</sup> / <sub>2</sub> in .....	60.00	6, 6 <sup>1</sup> / <sub>4</sub> and 6 <sup>1</sup> / <sub>2</sub> in .....	115.00



THE DUDGEON OLD STYLE EXPANDER FOR ONE SIZE TUBE ONLY.

Size, inches .....	2	2 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>4</sub>	3	3 <sup>1</sup> / <sub>4</sub>
Each .....	30.00	35.00	42.00	48.00	55.00	60.00
Size, inches .....	3 <sup>1</sup> / <sub>2</sub>	4	4 <sup>1</sup> / <sub>2</sub>	5	6	7
Each .....	70.00	85.00	100.00	120.00	130.00	180.00



CHEAP PATTERN ROLLER TUBE EXPANDERS.

Size, inches .....	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>4</sub>	1 <sup>7</sup> / <sub>8</sub>	2	2 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>
Each .....	10.00	10.00	10.00	10.00	10.00	12.00	14.00
Size, inches .....	2 <sup>3</sup> / <sub>4</sub>	3	3 <sup>1</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>2</sub>	4	5	6
Each .....	16.00	18.00	20.00	23.00	30.00	50.00	60.00

In ordering, please to give outside diameter and largest tube you wish to expand ;  
they answer for any thickness of Tube Sheet.

HORIZONTAL

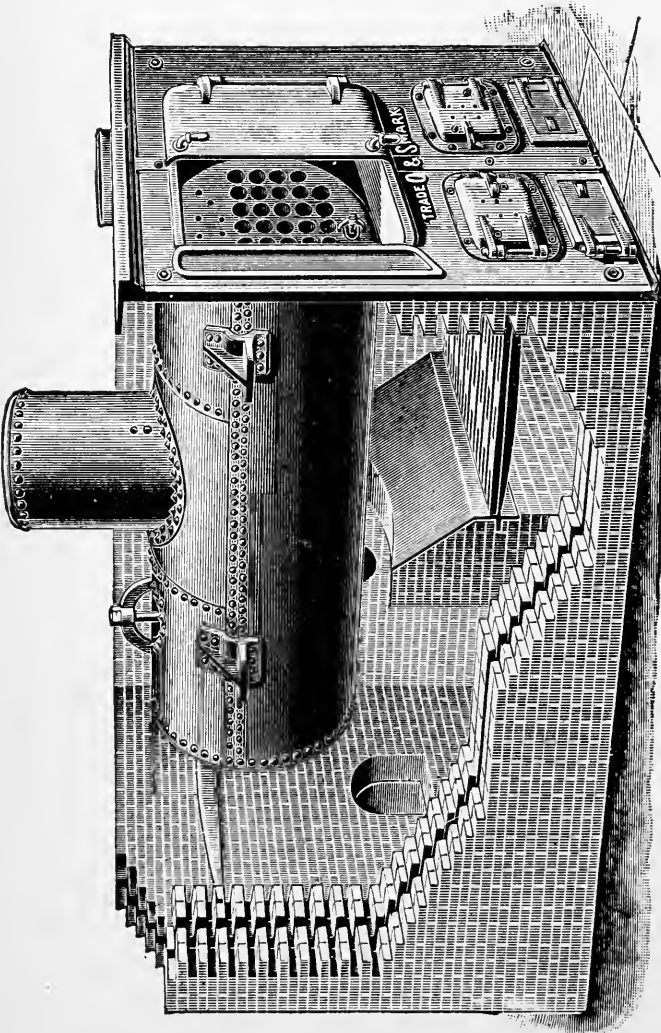
TUBULAR BOILERS.

FULL-ARCH FRONT SETTING.

These Boilers are built of Flange Steel 60,000 lbs. T. S.

FIXTURES FOR FULL-ARCH FRONT BOILER :—These comprise Front complete, with Liners for Fire Brick, Grates, Grate Bearers, Rear Arch Bars, Rear Ash Door and Frame, two Wall Plates with Rollers, Oval Stack Plate, Binder Bars and Cross Rods, Anchor Rods for Front, Safety Valve, Steam Gauge, Water Gauge fitted with Stand Pipe, three Gauge Cocks with Pipes, Whistle and Pipe, Blow-off Valve, Check and Stop Valves, Smoke Stack and Guys (four times the length of Stack).

Anything called for and not in above list will be charged as an extra.



Number of Size.....	18	19	20	22	24	26	28	30	32	34	36
Horse-Power as usually rated.....	10	12	15	20	25	30	35	45	55	65	75
Diameter of Shell, inches.....	30	30	36	36	42	44	48	54	60	66	72
Length of Tubes, feet.....	7	8	8	10	10	12	14	15	16	16	16
Diameter of Tubes, inches.....	3	3	3	3	3	3	3	3	4	4	4
Number of Tubes.....	20	20	22	22	22	22	22	22	22	22	22
Diameter of Dome, inches.....	18	20	20	20	22	24	28	30	32	34	36
Height of Dome, inches.....	20	20	22	22	22	24	28	30	32	34	36
Thickness of Shell, inches.....	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Thickness of Dome-Plate, inches.....	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Thickness of Heads, inches.....	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Square Feet of Heating Surface.....	130	160	191	270	380	445	510	642	840	1,359	1,670
Length of Grates, inches.....	32	32	36	42	48	48	54	54	54	54	54
Width of Grates, inches.....	30	30	36	36	42	44	48	48	48	48	48
Diameter of Stack, inches.....	14	14	16	16	20	20	22	22	26	30	32
Length of Stack, feet.....	28	28	28	35	35	40	50	50	60	60	60
Weight of Boiler, pounds, about.....	1,600	1,900	2,600	3,000	4,100	5,100	6,800	8,700	11,100	14,000	17,000
Weight of Boiler and Full-Arch Fixtures, pounds, about.....	3,800	4,100	5,300	6,000	7,900	9,300	11,800	14,000	17,500	21,000	24,000
Boiler with Four Wall Brackets, without Fixtures.....	\$161.00	\$173.00	\$194.00	\$224.00	\$296.00	\$346.00	\$483.00	\$600.00	\$780.00	\$880.00	\$1,050.00
Boiler with Full-Arch Fixtures, complete.....	\$366.00	\$320.00	\$350.00	\$387.00	\$480.00	\$560.00	\$733.00	\$897.00	\$1,107.00	\$1,225.00	\$1,450.00



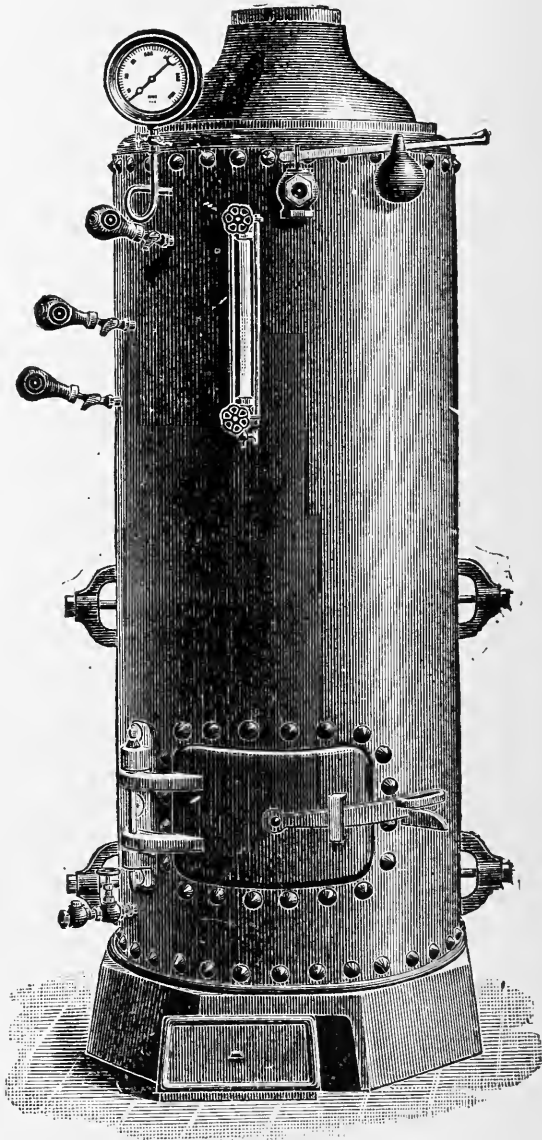


“FULL LENGTH TUBE” VERTICAL TUBULAR BOILERS.

TABLE OF DIMENSIONS AND PRICE LIST.

Number of Size.....	0	1	2	3	3½	4	5	6	7	8	9	10	11	12	13	14	15	16	16½	17
H. P. as usually rated.....	1½	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Diam. of Boiler in inches.....	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Height of Boiler in feet.....	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Diam. of Furnace in inches.....	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Height of Furnace in ins.....	18	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Thickness of Shell in ins.....	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32	7 32
Thickness of Heads in ins.....	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16	5-16
Thick. of Fur. Plate in ins.....	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
No. of Tubes (all 2 in. dia.).....	16	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Length of Tubes in ins.....	18	25	37	49	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Diameter of Stack in ins.....	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Thickness of Iron in Stack.....	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16	No 16
Weight of Boiler without Fixtures, lbs., about.....	350	900	1000	1100	1100	1200	1400	1600	1700	2100	2500	2800	3200	3600	4000	4500	5000	5600	6500	7600
Wt. of Boiler, with Fix., lbs.....	450	1300	1400	1500	1500	1800	2000	2200	2300	2700	3100	3700	4100	4500	5000	5400	5900	6400	7000	8100
Price of B'ler, without Fix.....	\$50	\$85	\$95	\$105	\$105	\$115	\$130	\$145	\$150	\$160	\$180	\$200	\$215	\$235	\$260	\$325	\$355	\$445	\$570	\$650
Price of B'lr., Bse., Gte., Hd.....	55	105	115	115	115	130	145	160	175	215	235	245	265	290	300	360	390	420	480	700
Price of B'lr., with Fix. com.....	65	108	118	128	128	145	160	175	195	215	235	260	280	305	380	410	440	500	650	730
Price ex. for Round Base.....	.....	5.00	5 00	5 00	6 00	6 00	6 00	6.00	7.50	7 50	7 50	9.00	9.00	9.00	12.00	12 00	12.00	12.00	.....	.....

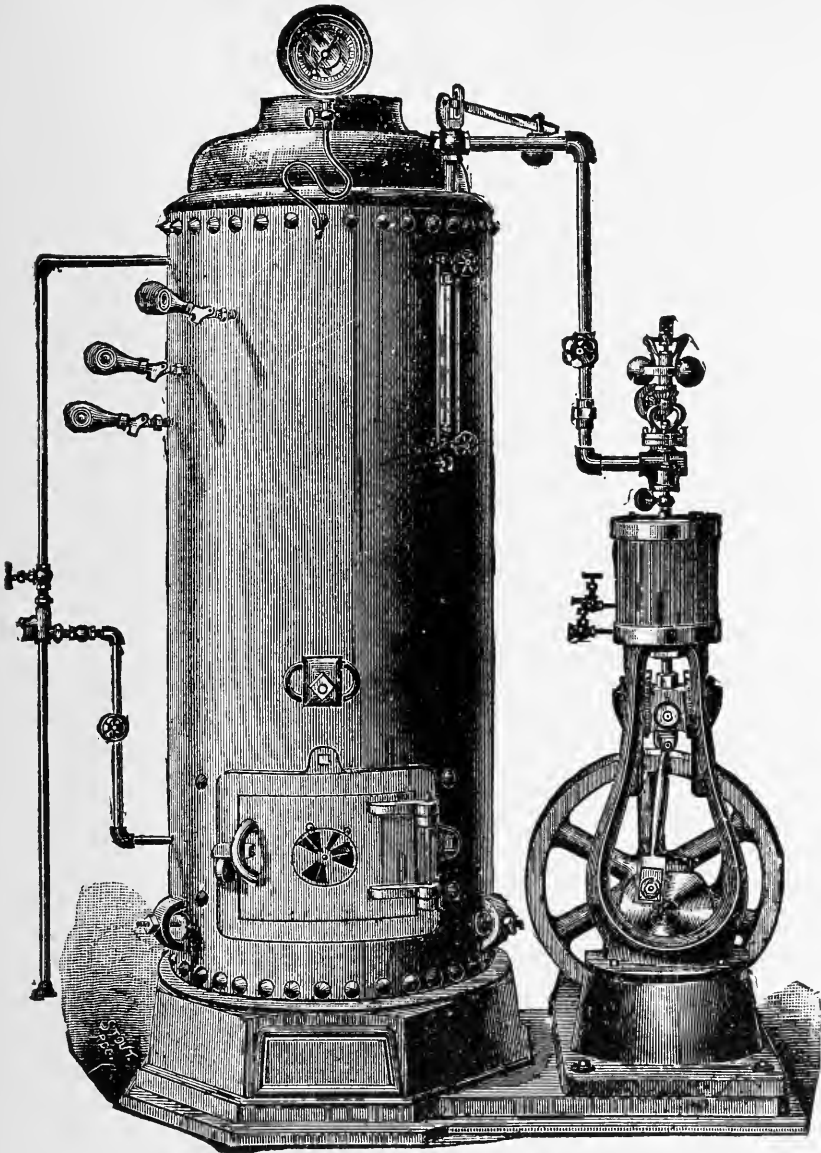
All separate or repair Castings sold by the pound. Prices for Stacks, Guys, etc., page 273.



Vertical Boiler with Octagon Base.

APPROXIMATE WEIGHTS OF THE VARIOUS CASTINGS.

Number of Boiler.....	0	1, 2, 3	3½	4, 5, 6	7, 8, 9	10, 11, 12	13, 14, 15, 16	16½, 17
Octagon Base.....	75	144	180	237	410	464	590	650
Round Base.....	75	231	237	298	370	742	975	160
Hood.....	15	53	70	92	143	226	398	...
Grates.....	2 pieces 20	2 pieces 42	2 pieces 51	3 pieces 78	3 pieces 158	4 pieces 224	4 pieces 320	4 pieces 480



“MONTAUK”  
VERTICAL  
ENGINE.

These Engines are self-contained, cannot get out of line, and require no foundation. They are built under careful supervision, and tested under steam before shipment. All wearing parts of ample size and well fitted. Crank shaft, piston rod, valve stem, crank and wrist pins and connecting rod of steel. Crosshead fitted with large brass gibs and instantly adjustable. Each Engine is fitted with governor, throttle valve, drip cocks, sight feed lubricator, wrenches and oil cups, making it a HIGH GRADE ENGINE FOR CONTINUOUS DUTY.

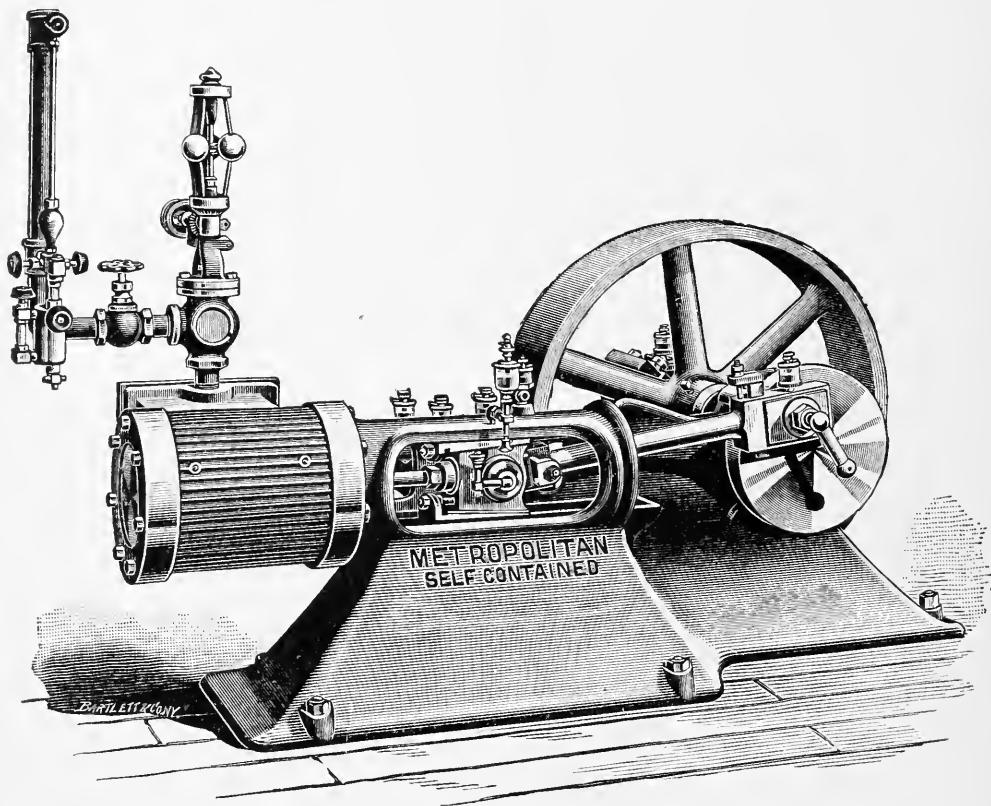
ENGINES AND BOILERS COMPLETE AS SHOWN.

Horse Power.....		3	4	5	6	7	9	10
SIZE OF CYLINDER }	Diameter, inches.....	3	4	5	6	6	7	7
	Stroke, inches.....	4	5	6	6	7	7	8
SIZE OF BOILER }	Diameter, inches.....	24	24	24	30	30	30	30
	Height, feet.....	4	5	6	5	5	6	7
Floor Space, inches.....		24 x 42	30 x 48	38 x 60	38 x 60	38 x 60	45 x 80	45 x 80
Weight, Complete.....		1500	1750	2700	2950	3100	4300	4500
Price.....		\$290	346	424	470	516	600	650

ENGINES COMPLETE WITHOUT BOILERS.

Horse Power.....	3	4	5	6	7	9	10	14	20	25	35
Diameter of Cylinder.....	3	4	5	6	6	7	7	8	9	10	12
Stroke of Piston.....	4	5	6	6	7	7	8	8	9	12	12
Revolutions of Crank.....	250	200	200	180	180	180	170	180	170	180	150
Diameter of Shaft.....	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	2 1/8	2 1/8	2 1/8	2 1/8	3 7/8	3 7/8
Diameter of Wheel.....	18	20	24	24	28	32	32	34	38	42	42
Face of Wheel.....	3 1/2	4	5	5 1/2	5 1/2	6	6	8	10	10	12
Weight of Wheel.....	110	120	200	240	250	475	500	550	850	1100	1200
Size of Steam Pipe.....	1 1/2	3/4	1	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	2	2 1/2	3
Size of Exhaust Pipe.....	1	1	1 1/4	1 1/2	1 1/2	2	2	2	2 1/2	3	3 1/2
Total Weight.....	325	400	700	850	900	1600	1700	1800	2700	4000	4400
Floor Space.....	14 x 24	16 x 28	20 x 34	20 x 34	20 x 34	22 x 39	22 x 39	25 x 45	31 x 55	36 x 60	36 x 60
Height.....	37	44	54	54	57	63	63	68	78	88	88
Price.....	\$140	166	196	208	218	265	285	330	450	580	670

THE METROPOLITAN  
SIDE CRANK SELF-CONTAINED ENGINE.



NUMBER.	1	2	3	4	5	6	7	8	9	10
									Low P	ressure.
Horse Power.....	10	15	20	25	30	40	50	70	6	15
Diameter of Cylinder.....	7	8	9	10	10	11	12	14	12	14
Stroke in inches.....	8	10	10	10	10	14	16	16	10	14
Revolutions.....	170	160	160	160	140	140	140	140	150	150
Diameter Crank Pin in inches....	2 <sup>3</sup> / <sub>16</sub>	3	3	3	3	3	3 <sup>7</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>16</sub>	3	3
Diameter Shaft in inches.....	2 <sup>7</sup> / <sub>16</sub>	3	3	3	3 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>4</sub>	4 <sup>3</sup> / <sub>4</sub>	3	3 <sup>7</sup> / <sub>8</sub>
Length Bearings in inches.....	7	9	9	9	10	10	12	12	9	10
Diameter Fly Wheel in inches....	34	38	38	38	42	42	50	50	38	42
Face Fly Wheel in inches.....	8	8	9	10	12	14	16	20	8	10
Weight Fly Wheel.....	500	850	900	1000	1300	1500	2000	2500	850	1000
Steam Pipe in inches.....	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	2	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	3	3 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>
Exhaust Pipe in inches.....	2	2	2 <sup>1</sup> / <sub>2</sub>	3	3	3	3 <sup>1</sup> / <sub>2</sub>	4	3	3
Floor Space of Bed in inches....	60x40	70x42	70x42	86x60	86x60	96x68	96x68	96x68	70x42	86x60
Weight Complete, lbs.....	1800	3000	3100	3200	4700	5000	7000	7500	3100	4500
Engine with Swift's brass sight feed oil cups, Double Glass Frass Sight Feed Lubricator, Plain Governor and Throttle Valve ..... Price	\$255.00	305.00	338.00	395.00	550.00	585.00	690.00	770.00	.....	.....
Engine with Swift's snap lever valve glass oil cups, Positive Wiping Oilers, Double Glass Sight Feed Lubricator Nickel Plated, Governor with Automat- ic Safety Stop Action and Soft Seat Throttle Valve..... Price	\$275.00	320.00	360.00	420.00	580.00	610.00	720.00	800.00	.....	.....

Quotations for No. 9 and No. 10 Low Pressure Engine will be made on application, as costs vary with different conditions of service.

PAT. CALENDERED IRON AND STEEL SHAFTING,

CUT BY LATHE TO ANY LENGTH DESIRED (DOWN TO ONE FOOT)

WITHOUT EXTRA CHARGE.

In designating lengths of shafts, when the lengths are composed of feet alone, or inches alone, the use of the signs ' and ' in place of the words "ft." and "in." is advised against, as a slight blur in copying will often render it difficult to determine which sign was used by the writer of the order.

Actual diameters wanted should be specified, as we manufacture "net" sizes as well as what are generally termed "turned shafting standards." For example, 1 1/8 shafting is frequently called 2 in. shafting because made from 2 in. round iron. Both sizes are made by us, hence a customer ordering a "2 in. shaft" from us would receive a shaft measuring exactly two inches in diameter, which would be one sixteenth of an inch too large if a turned shafting manufacturer's "2 in." (actual size 1 1/8) was the size required.

Orders are frequently tendered to us for lines of shafting without the length of each shaft being specified. In other words, lengths at our option. This should not be done when the hangers must be located at certain specified points; that is, it should only be done when the hangers can be supported at any points that the locations of the couplings may necessitate.

Location of pulley or other special keyseats should be shown by sketch. In addition it should be designated which shafts are to be keyseated upon both ends for couplings, and which upon one end only.

All shafts containing pulley or other special keyseats should be tested after the keyseating has been finished, and reststraightened if necessary. This applies alike to turned shafts and calendered shafts.

We are equipped for cutting keyseats in shafting, and also straightening facilities. Therefore, all shafts, whether keyseated or plain, are guaranteed perfectly straight.

PRICE LIST OF FINISHED SHAFTING.

Cut to length from 1 foot to 24 feet, inclusive.

Diameter.	Weight per Ft.	Price per lb. Cents.	Diameter.	Weight. per Ft.	Price per lb. Cents.	Diameter.	Weight per Ft.	Price per lb. Cents.
1/4	.167	10	1 5/8	7.04	5	3	24.06	5
5/16	.260	8 1/2	1 11/16	7.60		3 1/16	24.58	5 1/4
3/8	.370	7	1 3/4	8.16		3 1/8	26.10	
7/8	.510		1 13/16	8.78		3 3/16	27.16	
1 1/16	.666		1 7/8	9.40		3 1/4	28.24	
1 1/2	.843		1 15/16	10.00		3 5/16	29.40	
1 5/8	1 05	6	2	10.65		3 3/8	30.43	5 1/2
1 11/16	1.25		2 1/16	11.15		3 7/16	31.50	
1 3/4	1.50		2 1/8	12.07		3 1/2	32.64	
1 13/16	1.76		2 3/16	12.80		3 9/16	33.84	
1 7/8	2.03	5 1/2	2 1/4	13.50		3 5/8	35.20	
1 15/16	2.34		2 5/16	14.00		3 11/16	36.40	
1	2.64		2 3/8	15.07		3 3/4	37.45	6
1 1/16	3 00		2 7/16	15.83		3 7/8	39.85	
1 1/8	3 33	5	2 1/2	16.68		3 15/16	41.04	
1 3/16	3.74		2 9/16	17.55		4	42.50	
1 1/4	4.16		2 5/8	18.32		4 1/4	48.26	
1 5/16	4.61		2 11/16	19.31		4 7/16	52.62	
1 3/8	5.05	5	2 3/4	20.18		4 1/2	54.11	6 1/2
1 7/16	5.50		2 13/16	21.15		4 3/4	60.88	
1 1/2	6.00		2 7/8	22.10		4 5/16	65.50	
1 9/16	6.52		2 15/16	22.96		5	67.50	7

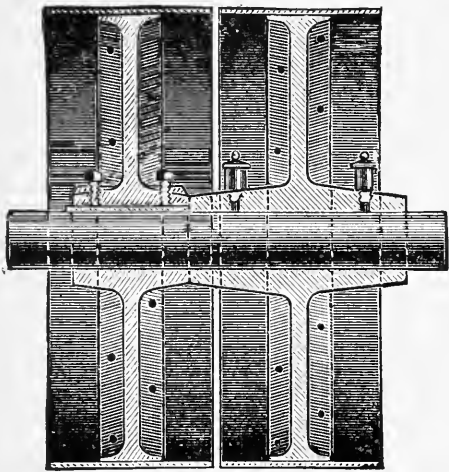
All Shafts larger than 4 inch are turned and polished.

LARGE TURNED SHAFTS.

We are prepared to furnish Turned Shafting all sizes up to 37 feet in length.

TIGHT AND LOOSE PULLEYS, PATENT STEEL RIM OR CAST IRON.

Additional Prices to be Added to Regular List, pages 279-280,  
in order to obtain list prices (per pair).

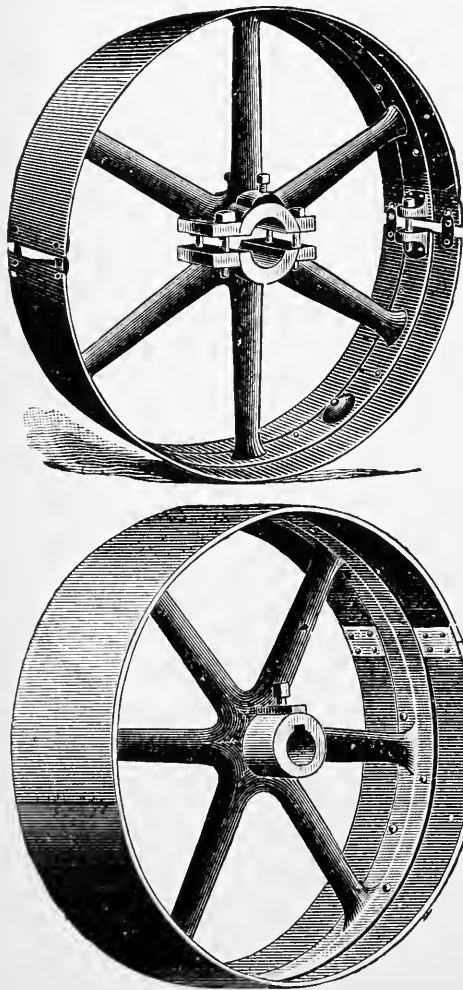


Diam. in Inches.	Price.	Diam. in Inches.	Price.
3 to 8	\$1.60	23 to 24	\$4.40
8½ to 10	1.95	25 to 26	4.75
10½ to 12	2.30	27 to 28	5.10
12½ to 14	2.65	29 to 30	5.45
14½ to 16	3.00	31 to 32	5.80
16½ to 18	3.30	33 to 34	6.15
19 to 20	3.70	35 to 36	6.50
21 to 22	4.05	37 to 40	7.20

Tight and loose pulleys are always made with Crowning Faces, while pulleys that drive them are made with flat faces.

SPLIT PULLEYS, PATENT STEEL RIM OR CAST IRON.

☞ Additional Prices to be added to Regular List, pages 279-280, in order to obtain list prices.



D'am. in Inches	Face in Inches.	Price	Diam. in Inches	Face in Inches.	Price
6 to 10	Up to 3	\$1.30	24 to 30	above 4 to 6	\$4.40
	above 3 to 6	1.75		" 6 to 10	5.40
	" 6 to 10	2.15		" 10 to 14	7.25
	" 10 to 14	3.10		" 14 to 20	10.00
				" 20 to 30	14.00
10½ to 18	Up to 3	1.50	31 to 36	Up to 4	4.50
	above 3 to 6	2.20		above 4 to 6	5.60
	" 6 to 10	2.85		" 6 to 10	6.75
	" 10 to 14	4.00		" 10 to 14	9.80
	" 14 to 18	5.25		" 14 to 20	13.00
				" 20 to 36	19.00
19 to 23	Up to 4	2.65	37 to 47	Up to 4	6.50
	above 4 to 6	3.40		above 4 to 6	7.50
	" 6 to 10	4.05		" 6 to 10	9.90
	" 10 to 14	5.60		" 10 to 14	13.50
	" 14 to 20	7.30		" 14 to 20	18.00
	" 20 to 26	11.00		" 20 to 30	27.00
24 to 30	Up to 4	3.60		" 30 to 40	37.00

PATENT STEEL RIM AND

MACHINE MOULDED

CAST IRON SOLID PULLEYS.

List Prices, pages 279-280.

# MACHINE MOLDED CAST IRON PULLEYS.

## FINISHED CAST IRON PULLEYS.

BORED, TURNED, BALANCED, AND WITH SET SCREWS.

Diameter in Inches.	Width of Face.	Single Belt.	Double Belt.	Diameter in Inches.	Width of Face.	Single Belt.	Double Belt.	Diameter in Inches.	Width of Face.	Single Belt.	Double Belt.	Diameter in Inches.	Width of Face.	Single Belt.	Double Belt.
3	2	\$1.40	.....	6½	8	\$3.15	\$4.35	9½	3	\$2.50	\$3.25	14	5	\$3.90	\$5.30
	3	1.55	.....		9	3.45	4.70		4	2.70	3.60		6	4.35	5.95
	4	1.70	.....		10	3.75	5.05		5	2.95	3.95		7	4.70	6.55
	5	1.85	.....		11	4.05	5.50		6	3.30	4.40		8	5.20	7.20
	6	2.00	.....		12	4.35	5.90		7	3.60	4.85		9	5.60	7.90
3½	2	1.45	.....	7	3	2.10	2.75		8	.....	5.30		10	6.10	8.60
	3	1.60	.....		4	2.25	3.00		9	.....	5.80		11	.....	9.30
	4	1.75	.....		5	2.50	3.35		10	.....	6.30		12	.....	10.00
	5	1.90	.....		6	2.75	3.70		11	.....	6.80		13	.....	10.80
	6	2.05	.....		7	3.00	4.05		12	.....	7.35		14	.....	11.60
	7	2.20	.....		8	3.25	4.45		13	.....	7.95				
					9	3.55	4.85		14	.....	8.55	15	3	3.40	4.40
4	2	1.50	.....	7½	10	3.85	5.25	10	3	2.55	3.35		4	3.75	5.00
	3	1.65	.....		11	4.20	5.70		4	2.75	3.70		5	4.15	5.65
	4	1.80	.....		12	4.50	6.10		5	3.05	4.10		6	4.60	6.30
	5	1.95	.....						6	3.40	4.55		7	5.05	6.95
	6	2.10	.....		3	2.20	2.85		7	3.70	5.00		8	5.50	7.65
	7	2.25	.....		4	2.35	3.10		8	.....	5.50		9	5.95	8.40
	8	2.40	.....		5	2.60	3.45		9	.....	6.00		10	6.45	9.15
4½	2	1.50	.....		6	2.85	3.85		10	.....	6.55		11	6.95	9.90
	3	1.70	.....		7	3.10	4.20		11	.....	7.10		12	.....	10.70
	4	1.90	.....		8	3.35	4.60		12	.....	7.65		13	.....	11.50
	5	2.10	.....		9	3.70	5.05		13	.....	8.25		14	.....	12.35
	6	2.30	.....		10	4.00	5.50		14	.....	8.90	16	3	3.60	4.70
	7	2.40	.....		11	4.35	5.95	11	3	2.70	3.55		4	3.95	5.30
	8	2.60	.....		12	4.65	6.35		4	2.95	3.95		5	4.40	6.00
	9	2.80	.....						5	3.25	4.40		6	4.90	6.70
5	2	1.55	.....	8	3	2.25	2.95		6	3.60	4.90		7	5.35	7.45
	3	1.75	.....		4	2.45	3.20		7	3.95	5.40		8	5.85	8.29
	4	1.95	.....		5	2.70	3.55		8	.....	5.95		9	6.30	9.00
	5	2.15	.....		6	2.95	3.95		9	.....	6.45		10	6.85	9.90
	6	2.35	.....		7	3.20	4.35		10	.....	7.05		11	7.40	10.60
	7	2.55	.....		8	3.45	4.75		11	.....	7.65		12	8.00	11.45
	8	2.75	.....		9	3.80	5.20		12	.....	8.20		13	.....	12.35
	9	2.95	.....		10	4.15	5.70		13	.....	8.85		14	.....	13.25
	10	3.15	.....		11	4.50	6.15		14	.....	9.50		15	.....	14.20
5½	2	1.60	.....		12	4.80	6.60						16	.....	15.15
	3	1.80	.....		13	5.20	7.15	12	3	2.85	3.75	17	3	3.80	5.00
	4	2.00	.....		14	5.60	7.75		4	3.15	4.20		4	4.20	5.65
	5	2.20	.....	8½	3	2.35	3.05		5	3.50	4.70		5	4.70	6.40
	6	2.40	.....		4	2.55	3.35		6	3.85	5.25		6	5.20	7.15
	7	2.60	.....		5	2.80	3.70		7	4.20	5.80		7	5.70	7.90
	8	2.80	.....		6	3.05	4.10		8	4.55	6.35		8	6.20	8.75
	9	3.00	.....		7	3.35	4.50		9	4.95	6.95		9	6.75	9.60
	10	3.20	.....		8	3.65	4.95		10	.....	7.55		10	7.30	10.45
	11	3.40	.....		9	3.95	5.40		11	.....	8.15		11	7.90	11.30
6	3	1.95	2.55		10	4.30	5.90		12	.....	8.75		12	8.50	12.25
	4	2.10	2.80		11	4.65	6.40		13	.....	9.40		13	.....	13.20
	5	2.30	3.10		12	5.00	6.85		14	.....	10.10		14	.....	14.15
	6	2.55	3.45		13	5.35	7.40	13	3	3.05	3.95		15	.....	15.15
	7	2.80	3.80		14	5.75	8.05		4	3.35	4.45	18	3	4.00	5.25
	8	3.05	4.15	9	3	2.40	3.15		5	3.70	5.00		4	4.45	5.95
	9	3.30	4.50		4	2.60	3.45		6	4.10	5.60		5	4.95	6.75
	10	3.60	4.85		5	2.85	3.80		7	4.45	6.20		6	5.50	7.60
	11	3.90	5.25		6	3.15	4.25		8	4.90	6.80		7	6.05	8.45
	12	4.20	5.65		7	3.45	4.65		9	5.25	7.45		8	6.60	9.30
6½	3	2.05	2.65		8	.....	5.10		10	.....	8.10		9	7.15	10.20
	4	2.20	2.90		9	.....	5.60		11	.....	8.75		10	7.75	11.10
	5	2.40	3.25		10	.....	6.10		12	.....	9.40		11	8.40	12.05
	6	2.65	3.70		11	.....	6.60		13	.....	10.10		12	9.10	13.05
	7	2.90	3.95		12	.....	7.10		14	.....	10.85		13	.....	14.05
					13	.....	7.70						14	.....	15.10
					14	.....	8.30	14	3	3.25	4.20		15	.....	16.15
									4	3.55	4.70				



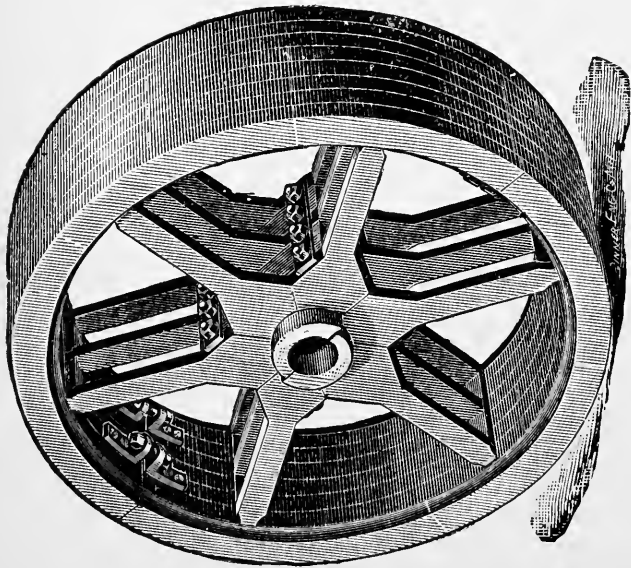
MACHINE MOLDED CAST IRON PULLEYS.

Diameter in inches.				Diameter in inches.				Diameter in inches.				Diameter in inches.			
Width of face.		Single belt.	Double belt.	Width of face.		Single belt.	Double belt.	Width of face.		Single belt.	Double belt.	Width of face.		Single belt.	Double belt.
18	16	.....	\$17.50	23	4	\$5 80	\$7.75	27	6	\$9 05	\$12 50	31	8	\$13.70	\$19.00
	17	.....	18 30		5	6.50	8 90		7	10.00	14.10		9	15.10	21.50
	18	.....	19 40		6	7.25	10 10		8	11.10	15.65		10	16.55	22.70
19	3	4.25	5 55	24	7	8.05	11 40	28	9	12.20	17.25	32	11	18.05	24.70
	4	4.70	6 30		8	8.85	12 70		10	13.35	18 90		12	19.55	26 75
	5	5.25	7 15		9	9.65	14 00		11	14.60	20 60		13	21.05	28 95
	6	5.85	8 10		10	10.50	15 35		12	15.90	22 20		14	22 60	31 15
	7	6.45	9 00		11	11.45	16 65		13	17.25	24 00		15	.....	33 45
	8	7.05	9 95		12	12 40	18 00		14	18 60	25 80		16	.....	35 80
	9	7.65	10 95		13	13 60	19 40		15	.....	27 70		17	.....	38 15
	10	8.30	11 95		14	14 85	20 85		16	.....	29 60		18	.....	40 50
	11	9.00	12 95		15	.....	22 30		17	.....	31 55		19	.....	42 90
	12	9.75	14 00		16	.....	23 75		18	.....	33 55		20	.....	45 35
20	13	.....	15 10	25	17	.....	25 30	29	19	.....	35 50	33	21	.....	.....
	14	.....	16 25		18	.....	26 90		20	.....	37 50		22	.....	.....
	15	.....	17 35		19	.....	28 40		.....	.....	.....		23	.....	.....
	16	.....	18 50		20	.....	29 95		.....	.....	.....		24	.....	.....
	17	.....	19 70		.....	.....	.....		.....	.....	.....		25	.....	.....
	18	.....	20 90		.....	.....	.....		.....	.....	.....		26	.....	.....
	3	4.45	5 85		3	5.40	7 00		3	6.75	8 70		3	8.45	10 45
	4	4.95	6 65		4	6.10	8 15		4	7.70	10 10		4	9 40	12 20
	5	5 55	7 55		5	6.85	9 35		5	8.50	11 55		5	10 45	14 10
	6	6 20	8 60		6	7 65	10 65		6	9 50	13 15		6	11 65	16 05
21	7	6.85	9 60		7	8.45	12 00		7	10 60	14 80		7	12 95	17 90
	8	7.50	10 60		8	9 30	13 40		8	11 70	16 40		8	14 40	19 85
	9	8.15	11 70		9	10 20	14 80		9	12 90	18 05		9	15 90	22 20
	10	8.85	12 80		10	11 10	16 20		10	13 10	19 80		10	17 40	23 85
	11	9 60	13 90		11	12 10	17 65		11	15 45	21 60		11	19 00	25 90
	12	10 40	15 00		12	13 15	19 00		12	16 85	23 30		12	20 55	28 00
	13	11 40	16 20		13	14 90	20 50		13	18 20	25 20		13	22 10	30 30
	14	12 40	17 40		14	15 70	22 00		14	19 55	27 10		14	23 70	32 65
	15	.....	18 60		15	.....	23 55		15	.....	29 10		15	.....	35 05
	16	.....	19 80		16	.....	25 10		16	.....	31 10		16	.....	37 45
22	17	.....	21 10		17	.....	26 75		17	.....	33 15		17	.....	39 85
	18	.....	22 40		18	.....	28 40		18	.....	35 25		18	.....	42 30
	19	.....	23 70		19	.....	30 05		19	.....	37 35		19	.....	44 70
	20	.....	25 00		20	.....	31 70		20	.....	39 45		20	.....	47 15
	3	4.70	6 15	26	3	5.70	7 40	30	3	7.25	9 15	34	3	8 90	11 00
	4	5.25	7 00		4	6.50	8 65		4	8.10	10 60		4	9 90	12 80
	5	5.85	8 00		5	7.25	9 90		5	9 00	12 15		5	11 00	14 80
	6	6.55	9 10		6	8.10	11 25		6	10 00	13 85		6	12 25	16 80
	7	7.25	10 20		7	8.95	12 70		7	11 15	15 50		7	13 60	18 80
	8	7.95	11 30		8	9 90	14 15		8	12 35	17 15		8	15 05	20 80
	9	8.65	12 45		9	10 85	15 60		9	13 60	18 85		9	16 70	22 85
	10	9 40	13 65		10	11 85	17 10		10	14 90	20 70		10	18 25	24 95
	11	10 20	15 85		11	12 90	18 60		11	16 30	22 60		11	19 90	27 10
	12	11 05	16 00		12	14 05	20 05		12	17 70	24 40		12	21 50	29 25
23	13	12 10	17 25		13	15 35	21 65		13	19 10	26 40		13	23 15	31 65
	14	13 20	18 55		14	16 65	23 25		14	20 55	28 40		14	24 80	34 10
	15	.....	20 80	27	15	.....	24 90	31	15	.....	30 50	35	15	.....	36 55
	16	.....	21 10		16	.....	26 60		16	.....	32 60		16	.....	39 05
	17	.....	22 50		17	.....	28 35		17	.....	34 80		17	.....	41 55
	18	.....	23 90		18	.....	30 10		18	.....	37 00		18	.....	44 10
	19	.....	25 25		19	.....	31 85		19	.....	39 20		19	.....	46 60
	20	.....	26 65		20	.....	33 60		20	.....	41 40		20	.....	49 15
	3	4.90	6 45		3	6.00	7 80		3	7 60	9 60		3	9 40	11 60
	4	5.55	7 40		4	6 90	9 15		4	8 55	11 10		4	10 40	13 50
	5	6.15	8 45		5	7 65	10 45		5	9 45	12 70		5	11 50	15 50
	6	6 90	9 60		6	8 60	11 40		6	10 55	14 55		6	12 90	17 60



# MACHINE MOLDED CAST IRON PULLEYS.

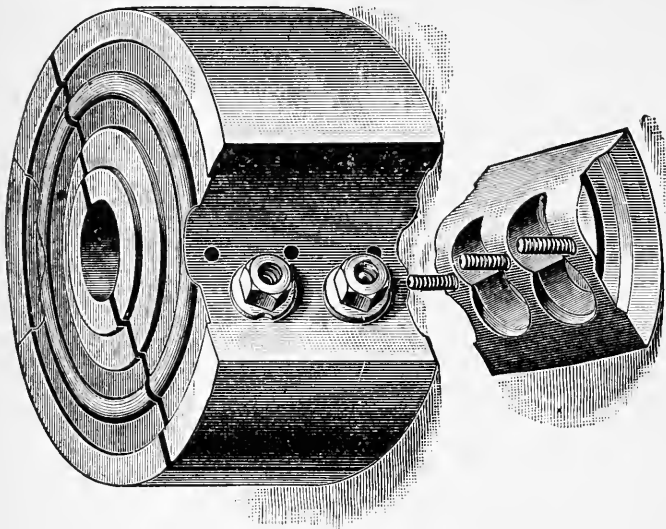
Diameter in inches.	Width of face.	Single belt.	Double belt.	Diameter in inches.	Width of face.	Single belt.	Double belt.	Diameter in inches.	Width of face.	Single belt.	Double belt.	Diameter in inches.	Width of face.	Single belt.	Double belt.
35	10	\$19.95	\$27.20	39	4	\$13.10	\$17.00	42	16	.....	\$54.40	46	6	\$21.85	\$28.90
	11	21.75	29.50		5	14.60	19.40		17	.....	57.70		7	24.05	32.00
	12	23.50	31.80		6	16.35	21.95		18	.....	61.00		8	26.35	35.15
	13	25.25	34.40		7	18.10	24.45		19	.....	64.30		9	28.60	38.35
	14	27.00	37.05		8	19.95	27.00		20	.....	67.60		10	30.95	41.55
	15	.....	39.70		9	21.85	29.55		21	.....	70.95		11	33.40	44.90
	16	.....	42.35		10	23.75	32.10		22	.....	74.30		12	35.80	48.20
	17	.....	45.00		11	25.75	34.65		23	.....	77.65		13	38.20	51.75
	18	.....	47.70		12	27.80	37.25		24	.....	81.00		14	40.60	55.30
	19	.....	50.40		13	29.85	39.85						15	43.15	58.95
	20	.....	53.10		14	31.90	42.45	43	4	15.55	20.15		16	.....	62.60
					15	.....	45.70		5	17.45	22.95		17	.....	66.30
36	3	10.40	12.75		16	.....	49.00		6	19.40	25.80		18	.....	70.00
	4	11.40	14.75		17	.....	52.25		7	21.40	28.65		19	.....	73.70
	5	12.65	16.95		18	.....	55.50		8	23.50	31.50		20	.....	77.40
	6	14.10	19.20		19	.....	58.55		9	25.60	34.35		21	.....	81.10
	7	15.70	21.45		20	.....	61.60		10	27.75	37.25		22	.....	84.80
	8	17.35	23.10		21	.....	64.65		11	30.00	40.25		23	.....	88.55
	9	19.10	26.00		22	.....	67.70		12	32.20	43.25		24	.....	92.30
	10	20.85	28.30		23	.....	70.75		13	34.40	46.50				
	11	22.70	30.70		24	.....	73.80		14	36.60	49.25	47	4	18.30	23.60
	12	24.50	33.10						15	.....	53.60		5	20.45	26.75
	13	26.30	35.80	40	4	13.70	17.75		16	.....	56.45		6	22.70	29.95
	14	28.10	38.55		5	15.30	20.30		17	.....	59.85		7	24.95	33.15
	15	.....	41.30		6	17.10	22.90		18	.....	63.25		8	27.30	36.40
	16	.....	44.05		7	18.90	25.50		19	.....	66.65		9	29.60	39.70
	17	.....	46.80		8	20.80	28.10		20	.....	70.05		10	32.05	43.00
	18	.....	49.55		9	22.75	30.70		21	.....	73.45		11	34.50	46.45
	19	.....	52.30		10	24.75	33.30		22	.....	76.90		12	37.00	49.85
	20	.....	55.05		11	26.80	36.05		23	.....	80.35		13	39.45	53.50
	21	.....	58.80		12	28.80	38.75		24	.....	83.80		14	41.95	57.15
	22	.....	61.55		13	30.85	41.75						15	.....	59.90
	23	.....	64.30		14	32.90	44.80	44	4	16.25	21.00		16	.....	64.65
	24	.....	67.05		15	.....	47.85		5	18.20	23.90		17	.....	68.45
					16	.....	50.90		6	20.25	26.85		18	.....	72.25
37	4	11.95	15.50		17	.....	54.20		7	22.30	29.75		19	.....	76.05
	5	13.25	17.95		18	.....	57.50		8	24.45	32.70		20	.....	79.85
	6	14.85	20.10		19	.....	60.60		9	26.60	35.65		21	.....	83.65
	7	16.80	22.45		20	.....	63.70		10	28.80	38.65		22	.....	87.45
	8	18.20	24.80		21	.....	66.70		11	31.10	41.80		23	.....	91.30
	9	20.00	27.15		22	.....	69.70		12	33.40	44.90		24	.....	95.15
	10	21.80	29.55		23	.....	72.80		13	35.65	48.25				
	11	23.70	32.00		24	.....	75.90		14	37.90	51.60	48	4	19.00	24.50
	12	25.55	34.50						15	.....	55.05		5	21.20	27.70
	13	27.40	37.30	41	4	14.30	18.55		16	.....	58.50		6	23.50	31.00
	14	29.30	40.10		5	15.95	20.80		17	.....	62.00		7	25.85	34.30
	15	.....	42.90		6	17.85	23.80		18	.....	65.50		8	28.25	37.65
	16	.....	45.70		7	19.95	26.50		19	.....	69.00		9	30.65	41.05
	17	.....	48.60		8	22.05	29.20		20	.....	72.50		10	33.15	44.45
	18	.....	51.50		9	23.70	31.85		21	.....	76.00		11	35.70	48.00
	19	.....	54.40		10	25.70	34.55		22	.....	79.50		12	38.20	51.50
	20	.....	57.30		11	27.80	37.40		23	.....	83.05		13	40.75	55.25
	21	.....	60.20		12	29.90	40.20		24	.....	86.65		14	43.30	59.00
	22	.....	63.10		13	32.00	43.25						15	.....	62.85
	23	.....	66.00		14	34.10	46.35	45	4	16.95	21.90		16	.....	66.70
	24	.....	68.90		15	.....	49.60		5	18.95	24.45		17	.....	70.60
					16	.....	52.85		6	21.05	27.85		18	.....	74.50
38	4	12.55	16.25		17	.....	56.15		7	23.15	30.85		19	.....	78.40
	5	13.95	18.65		18	.....	59.50		8	25.40	33.90		20	.....	82.30
	6	15.60	21.05		19	.....	62.55		9	27.60	37.00		21	.....	86.20
	7	17.95	23.45		20	.....	65.65		10	29.85	40.10		22	.....	90.10
	8	20.25	25.90		21	.....	68.80		11	32.25	43.35		23	.....	94.05
	9	22.55	28.35		22	.....	72.00		12	34.60	46.55		24	.....	98.00
	10	24.85	30.80		23	.....	75.20		13	36.90	50.00				
	11	27.15	33.35		24	.....	78.45		14	39.25	53.45	49	5	22.00	28.70
	12	29.45	35.95						15	.....	57.00		6	24.40	32.15
	13	31.75	38.80	42	4	14.90	19.30		16	.....	60.55		7	26.80	35.55
	14	34.05	41.65		5	16.70	22.05		17	.....	64.15		8	29.25	38.95
	15	.....	44.65		6	18.60	24.80		18	.....	67.75		9	31.70	42.45
	16	.....	47.65		7	20.55	27.55		19	.....	71.35		10	34.30	45.95
	17	.....	50.70		8	22.55	30.30		20	.....	74.95		11	36.90	49.55
	18	.....	53.70		9	24.60	33.05		21	.....	78.55		12	39.50	53.15
	19	.....	56.75		10	26.70	35.85		22	.....	82.15		13	42.10	57.00
	20	.....	59.80		11	28.85	38.75		23	.....	85.80		14	44.75	60.85
	21	.....	62.85		12	31.00	41.60		24	.....	89.45		15	.....	64.80
	22	.....	65.90		13	33.15	44.75	46	4	17.65	22.75		16	.....	68.75
	23	.....	68.95		14	35.30	47.95		5	19.70	25.80		17	.....	72.75
	24	.....	72.00		15	.....	51.15						18	.....	76.80



STYLE B PULLEY (12 in. and larger).

GILBERT  
WOOD SPLIT PULLEYS.

IN ORDERING PULLEYS, please state:  
1st, Style. 2d, Diameter. 3d, Width of Face.  
4th, Exact Size of Shaft. 5th, Kind of Face  
(Crown or Flat). UNLESS OTHERWISE SPEC-  
IFIED, Crown Face will be sent.



STYLE C PULLEY (3 to 14 inches).

WIDTH OF FACE (IN INCHES).

DIAM. Inches.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3	\$ 1.80	\$ 1.90	\$ 2.00	\$ 2.10	\$ 2.25	\$ 2.40	\$ 2.60	\$ 2.85	\$ 3.10	\$ 3.35	\$ 3.60	\$ 3.85	\$ 4.10	\$ 4.40	\$ 4.75	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....
4	1.90	2.00	2.10	2.20	2.40	2.60	2.85	3.10	3.35	3.60	3.85	4.10	4.40	4.75	5.10	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	2.00	2.10	2.20	2.35	2.55	2.75	3.00	3.25	3.50	3.75	4.00	4.30	4.65	5.00	5.35	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	2.10	2.20	2.30	2.45	2.65	2.85	3.10	3.35	3.60	3.85	4.15	4.50	4.85	5.20	5.55	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	2.25	2.40	2.60	2.80	3.00	3.25	3.50	3.75	4.00	4.30	4.65	5.00	5.40	5.80	6.10	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	2.35	2.50	2.70	2.90	3.10	3.35	3.60	3.85	4.10	4.40	4.75	5.10	5.50	5.90	6.30	.....	.....	.....	.....	.....	.....	.....	.....	.....
9	2.50	2.65	2.85	3.05	3.25	3.50	3.75	4.00	4.30	4.65	5.00	5.40	5.80	6.20	6.60	.....	.....	.....	.....	.....	.....	.....	.....	.....
10	2.65	2.80	3.00	3.20	3.40	3.65	3.90	4.15	4.45	4.80	5.20	5.60	6.00	6.40	6.80	7.00	7.50	8.00	8.50	9.00	9.20	.....	.....	.....
11	2.80	3.00	3.25	3.50	3.75	4.00	4.30	4.65	5.00	5.40	5.80	6.20	6.60	7.00	7.40	7.90	8.40	8.90	9.40	10.00	10.40	11.00	11.80	12.60
12	.....	3.15	3.40	3.65	3.90	4.10	4.45	4.80	5.20	5.60	6.00	6.40	6.80	7.20	7.60	8.00	8.50	9.00	9.50	10.00	10.40	11.00	11.80	12.60
13	.....	3.30	3.55	3.80	4.05	4.35	4.70	5.10	5.55	6.00	6.45	6.90	7.40	7.90	8.40	8.90	9.40	9.90	10.40	10.90	11.40	12.00	12.60	13.40
14	.....	3.45	3.70	3.95	4.25	4.60	5.00	5.45	5.90	6.35	6.80	7.30	7.80	8.30	8.80	9.30	9.80	10.30	10.80	11.30	11.80	12.40	13.00	13.80
15	.....	3.60	3.85	4.15	4.50	4.90	5.35	5.80	6.25	6.70	7.15	7.60	8.10	8.60	9.10	9.60	10.10	10.60	11.10	11.60	12.10	12.70	13.40	14.10
16	.....	3.75	4.00	4.30	4.65	5.05	5.50	5.95	6.40	6.85	7.30	7.80	8.30	8.80	9.30	9.80	10.30	10.80	11.30	11.80	12.40	13.10	13.80	14.60
17	.....	3.90	4.15	4.45	4.80	5.20	5.65	6.10	6.55	7.00	7.45	7.95	8.45	8.95	9.45	9.95	10.45	10.95	11.45	11.95	12.50	13.20	13.90	14.70
18	.....	4.05	4.30	4.60	4.95	5.35	5.80	6.25	6.70	7.15	7.60	8.10	8.60	9.10	9.60	10.10	10.60	11.10	11.60	12.10	12.70	13.40	14.10	15.00
19	.....	4.20	4.45	4.75	5.10	5.50	5.95	6.40	6.85	7.30	7.75	8.25	8.75	9.25	9.75	10.25	10.75	11.25	11.75	12.25	12.80	13.50	14.20	15.10
20	.....	4.35	4.60	4.90	5.25	5.65	6.10	6.55	7.00	7.45	7.90	8.40	8.90	9.40	9.90	10.40	10.90	11.40	11.90	12.40	13.00	13.70	14.40	15.30
21	.....	4.50	4.75	5.05	5.40	5.80	6.25	6.70	7.15	7.60	8.05	8.55	9.05	9.55	10.05	10.55	11.05	11.55	12.05	12.60	13.30	14.00	14.70	15.60
22	.....	4.65	4.90	5.20	5.55	5.95	6.40	6.85	7.30	7.75	8.20	8.70	9.20	9.70	10.20	10.70	11.20	11.70	12.20	12.75	13.40	14.10	14.80	15.70
23	.....	4.80	5.05	5.35	5.70	6.10	6.55	7.00	7.45	7.90	8.35	8.85	9.35	9.85	10.35	10.85	11.35	11.85	12.35	12.90	13.60	14.30	15.00	15.90
24	.....	.....	5.20	5.50	5.90	6.35	6.80	7.25	7.70	8.15	8.60	9.10	9.60	10.10	10.60	11.10	11.60	12.10	12.60	13.15	13.80	14.50	15.20	16.10
25	.....	.....	5.40	5.70	6.10	6.55	7.00	7.45	7.90	8.35	8.80	9.30	9.80	10.30	10.80	11.30	11.80	12.30	12.80	13.35	14.00	14.70	15.40	16.30

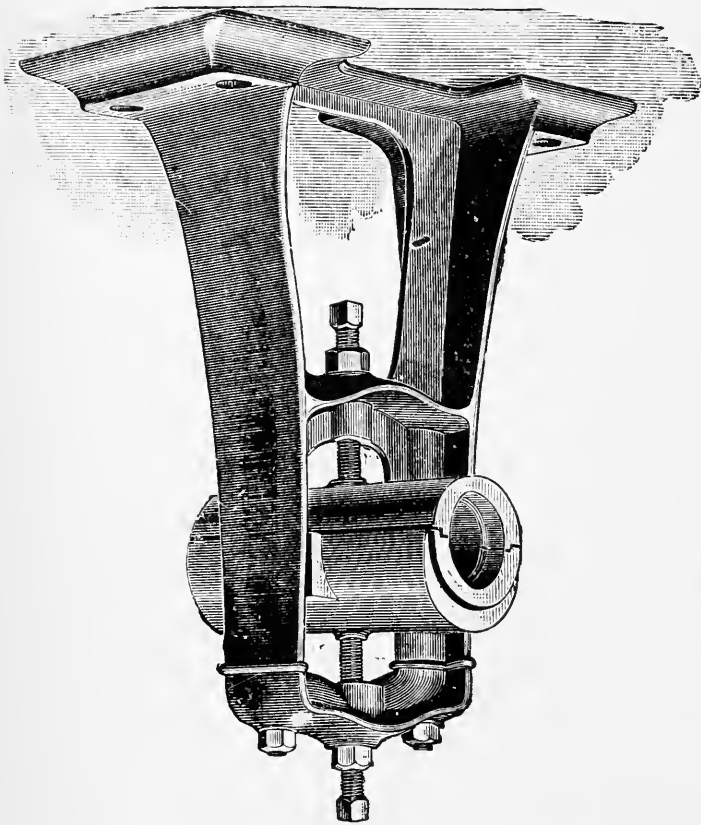
Continued

WIDTH OF FACE. (IN INCHES.)

DIAM. Inches.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
22	.....	\$ 5.00	\$ 5.60	\$ 6.30	\$ 7.00	\$ 7.70	\$ 8.40	\$ 9.20	\$10.00	\$10.80	\$11.70	\$12.60	\$13.50	\$14.50	\$15.50	\$16.60	\$17.70	\$18.80	\$20.00	\$21.30	\$22.40	\$23.60	\$24.80	\$26.00
23	.....	5.20	5.80	6.50	7.20	7.90	8.60	9.40	10.20	11.00	11.90	12.80	13.70	14.70	15.80	16.90	18.00	19.10	20.30	21.60	23.00	24.30	25.60	26.80
24	.....	5.50	6.20	7.00	7.80	8.60	9.40	10.30	11.20	12.10	13.00	14.00	15.00	16.10	17.20	18.30	19.40	20.60	21.80	23.20	24.60	26.00	27.30	28.50
25	.....	5.90	6.60	7.50	8.40	9.30	10.20	11.10	12.00	13.00	14.00	15.00	16.10	17.20	18.30	19.40	20.60	21.80	23.20	24.60	26.00	27.30	28.50	29.70
26	.....	6.20	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.10	17.20	18.30	19.40	20.60	21.80	23.20	24.60	26.00	27.30	28.50	29.70	31.00
27	.....	6.60	7.40	8.20	9.20	10.20	11.20	12.20	13.20	14.20	15.20	16.30	17.40	18.50	19.60	20.70	21.80	22.90	24.00	25.10	26.20	27.30	28.40	29.50
28	.....	7.00	7.80	8.60	9.50	10.50	11.50	12.50	13.50	14.50	15.50	16.60	17.70	18.80	19.90	21.00	22.10	23.20	24.30	25.40	26.50	27.60	28.70	29.80
29	.....	7.30	8.10	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.10	18.20	19.30	20.40	21.50	22.60	23.70	24.80	25.90	27.00	28.10	29.20	30.30
30	.....	7.70	8.50	9.40	10.40	11.40	12.40	13.40	14.40	15.40	16.50	17.60	18.70	19.80	20.90	22.00	23.10	24.20	25.30	26.40	27.50	28.60	29.70	30.80
31	.....	8.00	8.80	9.70	10.70	11.70	12.70	13.70	14.70	15.70	16.80	17.90	19.00	20.10	21.20	22.30	23.40	24.50	25.60	26.70	27.80	28.90	30.00	31.10
32	.....	8.50	9.30	10.20	11.20	12.20	13.20	14.20	15.20	16.30	17.40	18.50	19.60	20.70	21.80	22.90	24.00	25.10	26.20	27.30	28.40	29.50	30.60	31.70
33	.....	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00
34	.....	9.40	10.40	11.40	12.40	13.40	14.40	15.40	16.40	17.40	18.40	19.40	20.40	21.40	22.40	23.40	24.40	25.40	26.40	27.40	28.40	29.40	30.40	31.40
35	.....	9.85	11.15	12.45	13.85	15.25	16.80	18.35	19.90	21.50	23.10	24.70	26.30	27.90	29.50	31.10	32.70	34.30	35.90	37.50	39.10	40.70	42.30	43.90
36	.....	10.30	11.70	13.10	14.50	16.10	17.70	19.30	21.00	22.60	24.30	26.00	27.70	29.40	31.10	32.80	34.50	36.20	37.90	39.60	41.30	43.00	44.70	46.40
37	.....	10.80	12.30	13.80	15.40	17.00	18.70	20.40	22.10	23.80	25.50	27.20	28.90	30.60	32.30	34.00	35.70	37.40	39.10	40.80	42.50	44.20	45.90	47.60
38	.....	11.30	12.80	14.40	16.00	17.70	19.40	21.10	22.80	24.50	26.20	27.90	29.60	31.30	33.00	34.70	36.40	38.10	39.80	41.50	43.20	44.90	46.60	48.30
39	.....	11.80	13.40	15.00	16.70	18.40	20.10	21.80	23.50	25.20	26.90	28.60	30.30	32.00	33.70	35.40	37.10	38.80	40.50	42.20	43.90	45.60	47.30	49.00
40	.....	12.30	13.90	15.50	17.20	18.90	20.60	22.30	24.00	25.70	27.40	29.10	30.80	32.50	34.20	35.90	37.60	39.30	41.00	42.70	44.40	46.10	47.80	49.50
41	.....	12.80	14.40	16.00	17.70	19.40	21.10	22.80	24.50	26.20	27.90	29.60	31.30	33.00	34.70	36.40	38.10	39.80	41.50	43.20	44.90	46.60	48.30	50.00
42	.....	13.30	14.90	16.50	18.20	19.90	21.60	23.30	25.00	26.70	28.40	30.10	31.80	33.50	35.20	36.90	38.60	40.30	42.00	43.70	45.40	47.10	48.80	50.50
43	.....	13.80	15.40	17.00	18.70	20.40	22.10	23.80	25.50	27.20	28.90	30.60	32.30	34.00	35.70	37.40	39.10	40.80	42.50	44.20	45.90	47.60	49.30	51.00
44	.....	14.30	15.90	17.50	19.20	20.90	22.60	24.30	26.00	27.70	29.40	31.10	32.80	34.50	36.20	37.90	39.60	41.30	43.00	44.70	46.40	48.10	49.80	51.50
45	.....	14.80	16.40	18.00	19.70	21.40	23.10	24.80	26.50	28.20	29.90	31.60	33.30	35.00	36.70	38.40	40.10	41.80	43.50	45.20	46.90	48.60	50.30	52.00
46	.....	15.30	16.90	18.50	20.20	21.90	23.60	25.30	27.00	28.70	30.40	32.10	33.80	35.50	37.20	38.90	40.60	42.30	44.00	45.70	47.40	49.10	50.80	52.50
47	.....	15.80	17.40	19.00	20.70	22.40	24.10	25.80	27.50	29.20	30.90	32.60	34.30	36.00	37.70	39.40	41.10	42.80	44.50	46.20	47.90	49.60	51.30	53.00
48	.....	16.30	17.90	19.50	21.20	22.90	24.60	26.30	28.00	29.70	31.40	33.10	34.80	36.50	38.20	39.90	41.60	43.30	45.00	46.70	48.40	50.10	51.80	53.50
49	.....	16.80	18.40	20.00	21.70	23.40	25.10	26.80	28.50	30.20	31.90	33.60	35.30	37.00	38.70	40.40	42.10	43.80	45.50	47.20	48.90	50.60	52.30	54.00
50	.....	17.30	18.90	20.50	22.20	23.90	25.60	27.30	29.00	30.70	32.40	34.10	35.80	37.50	39.20	40.90	42.60	44.30	46.00	47.70	49.40	51.10	52.80	54.50
51	.....	17.80	19.40	21.00	22.70	24.40	26.10	27.80	29.50	31.20	32.90	34.60	36.30	38.00	39.70	41.40	43.10	44.80	46.50	48.20	49.90	51.60	53.30	55.00
52	.....	18.30	19.90	21.50	23.20	24.90	26.60	28.30	30.00	31.70	33.40	35.10	36.80	38.50	40.20	41.90	43.60	45.30	47.00	48.70	50.40	52.10	53.80	55.50
53	.....	18.80	20.40	22.00	23.70	25.40	27.10	28.80	30.50	32.20	33.90	35.60	37.30	39.00	40.70	42.40	44.10	45.80	47.50	49.20	50.90	52.60	54.30	56.00
54	.....	19.30	20.90	22.50	24.20	25.90	27.60	29.30	31.00	32.70	34.40	36.10	37.80	39.50	41.20	42.90	44.60	46.30	48.00	49.70	51.40	53.10	54.80	56.50
55	.....	19.80	21.40	23.00	24.70	26.40	28.10	29.80	31.50	33.20	34.90	36.60	38.30	40.00	41.70	43.40	45.10	46.80	48.50	50.20	51.90	53.60	55.30	57.00
56	.....	20.30	21.90	23.50	25.20	26.90	28.60	30.30	32.00	33.70	35.40	37.10	38.80	40.50	42.20	43.90	45.60	47.30	49.00	50.70	52.40	54.10	55.80	57.50
57	.....	20.80	22.40	24.00	25.70	27.40	29.10	30.80	32.50	34.20	35.90	37.60	39.30	41.00	42.70	44.40	46.10	47.80	49.50	51.20	52.90	54.60	56.30	58.00
58	.....	21.30	22.90	24.50	26.20	27.90	29.60	31.30	33.00	34.70	36.40	38.10	39.80	41.50	43.20	44.90	46.60	48.30	50.00	51.70	53.40	55.10	56.80	58.50
59	.....	21.80	23.40	25.00	26.70	28.40	30.10	31.80	33.50	35.20	36.90	38.60	40.30	42.00	43.70	45.40	47.10	48.80	50.50	52.20	53.90	55.60	57.30	59.00
60	.....	22.30	23.90	25.50	27.20	28.90	30.60	32.30	34.00	35.70	37.40	39.10	40.80	42.50	44.20	45.90	47.60	49.30	51.00	52.70	54.40	56.10	57.80	59.50
61	.....	22.80	24.40	26.00	27.70	29.40	31.10	32.80	34.50	36.20	37.90	39.60	41.30	43.00	44.70	46.40	48.10	49.80	51.50	53.20	54.90	56.60	58.30	60.00
62	.....	23.30	24.90	26.50	28.20	29.90	31.60	33.30	35.00	36.70	38.40	40.10	41.80	43.50	45.20	46.90	48.60	50.30	52.00	53.70	55.40	57.10	58.80	60.50
63	.....	23.80	25.40	27.00	28.70	30.40	32.10	33.80	35.50	37.20	38.90	40.60	42.30	44.00	45.70	47.40	49.10	50.80	52.50	54.20	55.90	57.60	59.30	61.00
64	.....	24.30	25.90	27.50	29.20	30.90	32.60	34.30	36.00	37.70	39.40	41.10	42.80	44.50	46.20	47.90	49.60	51.30	53.00	54.70	56.40	58.10	59.80	61.50
65	.....	24.80	26.40	28.00	29.70	31.40	33.10	34.80	36.50	38.20	39.90	41.60	43.30	45.00	46.70	48.40	50.10	51.80	53.50	55.20	56.90	58.60	60.30	62.00
66	.....	25.30	26.90	28.50	30.20	31.90	33.60	35.30	37.00	38.70	40.40	42.10	43.80	45.50	47.20	48.90	50.60	52.30	54.00	55.70	57.40	59.10	60.80	62.50
67	.....	25.80	27.40	29.00	30.70	32.40	34.10	35.80	37.50	39.20	40.90	42.60	44.30	46.00	47.70	49.40	51.10	52.80	54.50	56.20	57.90	59.60	61.30	63.00
68	.....	26.30	27.90	29.50	31.20	32.90	34.60	36.30	38.00	39.70	41.40	43.10	44.80	46.50	48.20	49.90	51.60	53.30	55.00	56.70	58.40	60.10	61.80	63.50
69	.....	26.80	28.40	30.00	31.70	33.40	35.10	36.80	38.50	40.20	41.90	43.60	45.30	47.00	48.70	50.40	52.10	53.80	55.50	57.20	58.90	60.60	62.30	64.00
70	.....	27.30	28.90	30.50	32.20	33.90	35.60	37.30	39.00	40.70	42.40	44.10	45.80	47.50										

ADJUSTABLE DOUBLE BRACED SELF-OILING  
HANGER.

WITH BABBITTED BOXES. (INTERCHANGEABLE.)

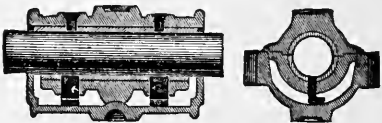


VARIABLE DROP.

(1 1/2 to 2 inch range.)

Construction such as to permit of quick adjustment to any drops that may be desired within the range specified.


SECTIONAL VIEWS OF BOXES.

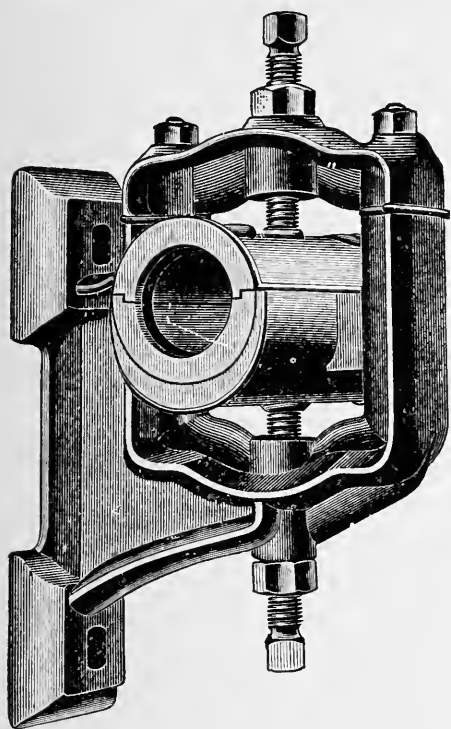


Before placing shafting in position, oil chambers should be filled with oil nearly to level of bottom of shaft, and should be cleaned out and refilled with fresh oil every three to six months, according to speed at which shafting runs.

Range of Drop in Ins.		6 to 8	8 1/2 to 10	10 1/2 to 12	12 1/2 to 14	14 1/2 to 16	16 1/2 to 18	18 1/2 to 20	20 1/2 to 22	Length of Bearing. Inches.
Diam. Shaft.	15-16	\$3.20	3.65	4.30	4.90	5.35	5.70	6.00	6.10	4
	13-16	3.85	4.30	4.70	5.20	5.60	6.00	6.15	6.25	5
	11-16	4.15	4.60	5.10	5.60	5.90	6.10	6.30	6.50	5
	7-16	4.50	4.95	5.35	5.85	6.25	6.40	6.70	6.90	6
	11-16	5.20	5.60	6.00	6.50	6.90	7.00	7.30	7.50	7

Range of Drop in Ins.		7 to 9	10 to 12	13 to 15	16 to 18	19 to 21	22 to 24	25 to 27	28 to 30	Length of Bearing. Inches.
Diameter of Shafting.	1 15-16	\$6.95	7.60	8.25	8.90	9.55	10.20	10.85	11.70	8
	2 3-16	8.45	9.35	10.15	10.80	11.50	12.50	13.40	14.25	9
	2 7-16	10.55	11.20	12.00	13.00	14.00	15.10	16.10	17.85	10
	2 11-16	13.15	13.80	15.35	16.00	16.90	18.30	20.15	22.75	11
	3 15-16	15.60	16.75	18.05	19.25	20.15	21.80	23.40	26.30	12
	3 3-16	17.00	19.80	21.20	22.40	23.40	25.35	26.95	29.90	13
	3 7-16	.....	25.35	27.30	28.90	30.20	32.50	34.45	37.70	14
	3 15-16	.....	31.20	33.15	34.80	36.10	38.35	40.95	42.90	16
	4 7-16	.....	42.25	42.90	43.85	45.50	47.45	50.05	53.30	16
	4 15-16	.....	46.80	48.75	51.00	53.95	57.85	63.05	68.90	18

 A very complete stock of these Hangers is carried, and we are prepared to furnish them with boxes for any size of shafting immediately upon receipt of orders.

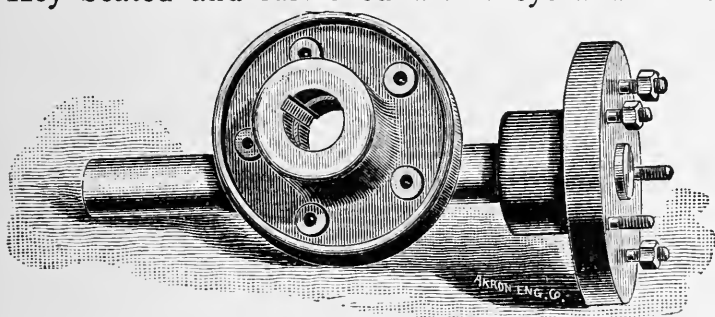


## ADJUSTABLE SELF OILING POST HANGER.

Diam. of Shaft	Price.	Length of Bearing.	Distance from Foot to Center.
1 $\frac{3}{16}$	\$3.80	5	4
1 $\frac{7}{16}$	4.30	6	4 $\frac{5}{8}$
1 $\frac{11}{16}$	5.40	7	4 $\frac{5}{8}$
1 $\frac{15}{16}$	6.40	8	5 $\frac{1}{2}$
2 $\frac{3}{16}$	8.10	9	5 $\frac{1}{2}$
2 $\frac{7}{16}$	10.20	10	6 $\frac{5}{8}$
2 $\frac{11}{16}$	12.90	11	6 $\frac{5}{8}$
2 $\frac{15}{16}$	16.20	12	8 $\frac{1}{8}$
3 $\frac{3}{16}$	20.70	13	8 $\frac{1}{8}$
3 $\frac{7}{16}$	26.20	14	9 $\frac{5}{8}$
3 $\frac{11}{16}$	32.10	15	9 $\frac{5}{8}$
3 $\frac{15}{16}$	38.00	16	11
4 $\frac{3}{16}$	44.25	16	11
4 $\frac{7}{16}$	50.50	16	13 $\frac{1}{4}$
4 $\frac{11}{16}$	64.50	18	13 $\frac{1}{4}$
5 $\frac{7}{16}$	78.50	20	15 $\frac{1}{4}$

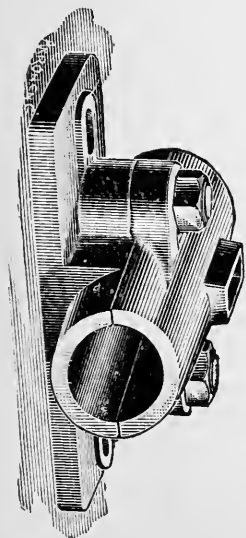
## FLANGE-FACED OR PLATE COUPLING.

Key Seated and furnished with Keys and Bolts.



Diam. of Shaft.	PRICE PER PAIR.	
	Fitted to Shafts.	Not Fitted to Shafts.
1 3-16	\$ 7.00	\$ 4.00
1 7-16	8.00	5.00
1 11-16	8.50	5.50
1 15-16	9.00	6.00
2 3-16	10.50	7.00
2 7-16	12.50	8.50
2 11-16	15.25	10.75
2 15-16	18.25	13.35
3 3-16	21.75	15.25
3 7-16	25.25	18.25
3 11-16	29.25	21.25
3 15-16	33.25	24.75
4 7-16	43.25	34.25
4 15-16	54.75	44.25
5 7-16	67.00	53.50
5 15-16	81.00	64.00
6 7-16	95.50	78.50
6 15-16	110.00	92.00
7 7-16	126.00	107.50
7 15-16	142.00	123.00
8 7-16	160.00	140.50
8 15-16	180.00	160.00
9 7-16	200.00	180.00

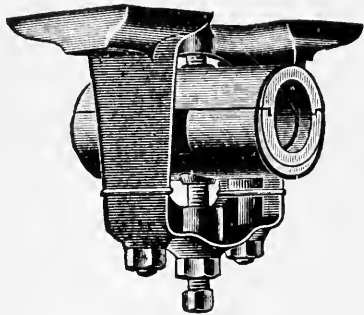
## RIGID JOURNAL BOXES.



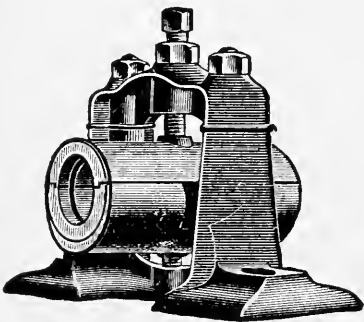
Diam. of Shaft.	Price.	Length Bearing.	Base. Length.	Base. Width.	Cen. to Cen. of Bolts.	Bolts. Size.	No.
1 $\frac{5}{16}$	\$1.30	3 $\frac{1}{4}$	7	1 $\frac{7}{8}$	5 $\frac{1}{8}$	$\frac{1}{2}$	2
1 $\frac{9}{16}$	1.60	5	7 $\frac{5}{8}$	2 $\frac{5}{8}$	5 $\frac{7}{8}$	$\frac{1}{2}$	2
1 $\frac{13}{16}$	2.00	5	7 $\frac{5}{8}$	2 $\frac{5}{8}$	5 $\frac{7}{8}$	$\frac{1}{2}$	2
1 $\frac{15}{16}$	2.65	5 $\frac{3}{4}$	9	3	7	$\frac{3}{8}$	2
2 $\frac{1}{16}$	3.35	6 $\frac{1}{2}$	9 $\frac{1}{4}$	3 $\frac{1}{2}$	7 $\frac{1}{8}$	$\frac{3}{8}$	2
2 $\frac{3}{16}$	4.00	7 $\frac{1}{4}$	9 $\frac{1}{2}$	4	7 $\frac{1}{4}$	$\frac{3}{4}$	2
2 $\frac{7}{16}$	4.80	8	11 $\frac{1}{8}$	4 $\frac{1}{4}$	8 $\frac{1}{2}$	$\frac{3}{4}$	2
2 $\frac{11}{16}$	5.65	9	11 $\frac{1}{2}$	4 $\frac{3}{4}$	9	$\frac{3}{4}$	2
2 $\frac{15}{16}$	6.70	9 $\frac{3}{4}$	13	5 $\frac{1}{8}$	10	$\frac{7}{8}$	2
3 $\frac{1}{16}$	7.75	10 $\frac{3}{4}$	13 $\frac{1}{4}$	5 $\frac{1}{2}$	10 $\frac{3}{8}$	$\frac{7}{8}$	2
3 $\frac{1}{16}$	8.90	11 $\frac{1}{2}$	14	6 $\frac{1}{8}$	10 $\frac{3}{4}$	$\frac{7}{8}$	2
3 $\frac{11}{16}$	10.10	12	15 $\frac{1}{4}$	6 $\frac{1}{2}$	11 $\frac{3}{4}$	1	2
3 $\frac{15}{16}$	11.50	13	16	7	12 $\frac{1}{2}$	1	2
4 $\frac{3}{16}$	13.25	13	18	8	14	1	2
4 $\frac{7}{16}$	15.00	13	18	8	14	1	2
4 $\frac{11}{16}$	19.00	16	18 $\frac{1}{2}$	9	15	1	2

ADJUSTABLE SELF-OILING PILLOW BLOCKS AND "SHORT DROP" HANGERS.

With Babbitted Boxes. Interchangeable. Drop Variable.



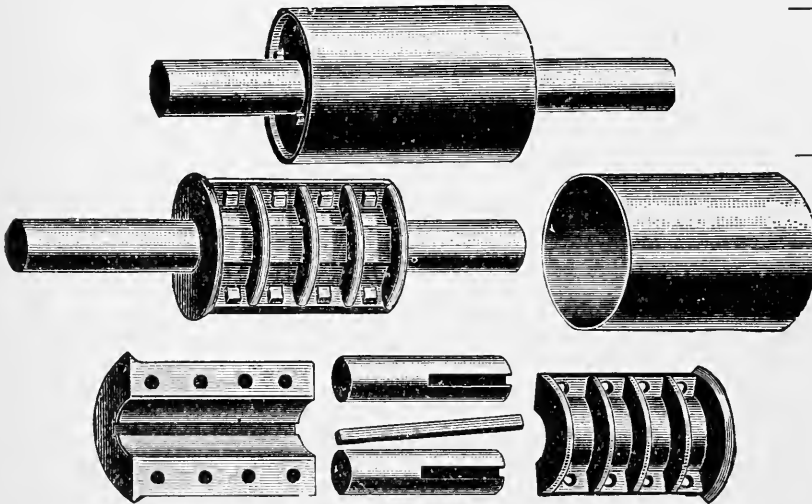
ADJUSTABLE SELF-OILING  
PILLOW BLOCKS.



Diam. of Shaft.	Price.	Length of Bearing.
1 5/16	\$3.90	4
1 3/8	4.20	5
1 5/8	4.50	5
1 7/8	4.80	6
1 11/16	5.90	7
1 15/16	7.40	8
2 3/16	9.30	9
2 7/16	11.30	10
2 11/16	13.80	11
2 15/16	16.90	12
3 3/16	21.10	13
3 7/16	25.30	14
3 11/16	30.60	15
3 15/16	35.80	16
4 3/16	41.70	16
4 7/8	47.60	16
4 15/16	61.50	18
5 7/16	75.50	20

COMPRESSION COUPLINGS AND SLIP COLLARS.

Couplings fitted for Shafts and furnished with Keys and Bolts.



Size. Inches.	Compression Coupling.	Solid Set Collar.	Patent Safety Split Collar.
1 5/16	\$5.00	\$0.70	\$1.00
1 3/8	5.50	.80	1.20
1 5/8	5.70	.90	1.35
1 7/8	6.00	1.00	1.50
1 11/16	7.00	1.20	1.80
1 15/16	8.00	1.40	2.10
2 3/16	9.00	1.60	2.40
2 7/16	10.75	1.80	2.70
2 11/16	13.00	2.10	3.15
2 15/16	16.50	2.40	3.60
3 3/16	20.00	2.70	4.00
3 7/16	24.00	3.00	4.50
3 11/16	28.00	3.30	4.95
3 15/16	32.00	3.60	5.40
4 3/16	42.00	4.70	6.00
4 7/8	53.00	5.90	7.35
5 1/16	65.00	7.20	10.80
5 5/8	78.00	8.60	12.90
6 1/16	90.00	10.10	15.15
6 7/8	112.00	12.70	19.00

Patent Safety Set Collars.

SPLIT.

The Set Screw is pro-  
tected and cannot catch  
belts, clothes, etc.

Furnished only when  
specially ordered.



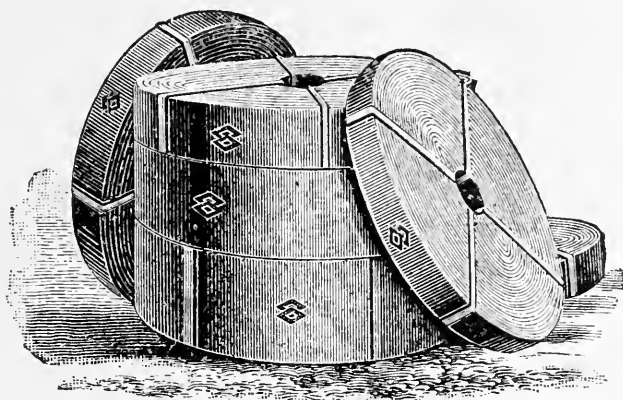
SOLID  
SET  
COLLAR.

When so desired compression couplings  
will be furnished without covers.

Reduction compression couplings for connecting shafts of different diameters, same price as plain compression couplings for shafting of the larger size.



# LEATHER AND RUBBER BELTING.



## REVISED PRICE LIST OF LEATHER BELTING.

NOVEMBER 20, 1899.

Intermediate Widths at Proportionate Prices. Heavy Double Belts Twice the Price of Single.

### PRICE PER RUNNING FOOT.

Width	Run'g ft.	Width.	Run'g ft.	Width.	Run'g ft.	Width.	Run'g ft.
1 inch.....	\$0.14	4 1/2 inch.....	\$0.82	13 inch.....	\$2.41	25 inch.....	4.63
1 1/4 ".....	.19	5 ".....	.91	14 ".....	2.59	26 ".....	4.81
1 1/2 ".....	.24	5 1/2 ".....	1.01	15 ".....	2.78	28 ".....	5.18
1 3/4 ".....	.29	6 ".....	1.11	16 ".....	2.96	30 ".....	5.55
2 ".....	.34	6 1/2 ".....	1.20	17 ".....	3.15	32 ".....	5.92
2 1/4 ".....	.39	7 ".....	1.30	18 ".....	3.33	34 ".....	6.29
2 1/2 ".....	.43	8 ".....	1.48	19 ".....	3.52	36 ".....	6.66
2 3/4 ".....	.48	9 ".....	1.67	20 ".....	3.70	40 ".....	7.40
3 ".....	.53	10 ".....	1.85	21 ".....	3.89	52 ".....	9.62
3 1/2 ".....	.63	11 ".....	2.04	22 ".....	4.07	60 ".....	11.10
4 ".....	.72	12 ".....	2.22	24 ".....	4.44	72 ".....	13.32

### SOLID ROUND BELTS.

Inches.....	1/8	3/16	1/4	5/16	3/8
Prices Running ft.	.7	.9	.14	.18	.24

### ROUND TWIST BELTS.

Inches.....	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1
Prices Running ft.	.8	.12	.17	.22	.27	.38	.48	.60	.80	.96

### CUT LACE.

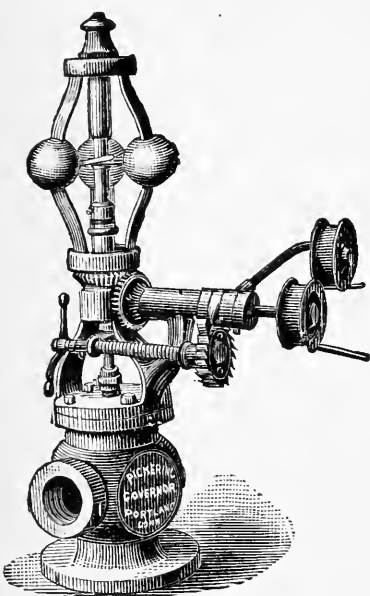
1 1/4 inch, per 100 feet.....	\$1.00	1 1/2 inch, per 100 feet.....	\$2.00
1 5/8 " " 100 ".....	1.25	5/8 " " 100 ".....	2.75
1 3/8 " " 100 ".....	1.50	3/4 " " 100 ".....	3.25
1 7/8 " " 100 ".....	1.75		

## RUBBER BELTING.

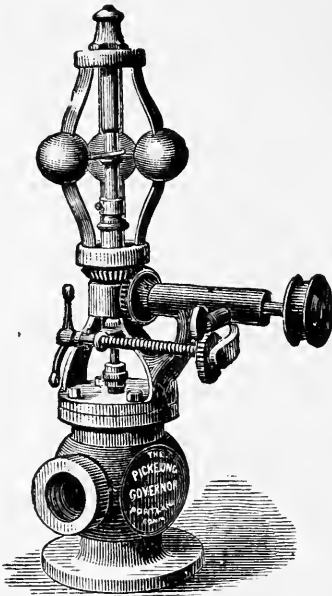
Width in Inches.	2-Ply.	3-Ply.	4-Ply.	5-Ply.	Width in Inches.	2-Ply.	3-Ply.	4-Ply.	5-Ply.
1 1/2.....	.12	.14	.17	.....	9.....	.67	.80	.95	1.13
2.....	.15	.17	.22	.....	10.....	.75	.90	1.07	1.33
2 1/2.....	.19	.22	.26	.....	12.....	.91	1.08	1.30	1.62
3.....	.22	.26	.31	.....	14.....	1.08	1.28	1.54	1.92
3 1/2.....	.26	.30	.37	.....	16.....	1.25	1.50	1.78	2.22
4.....	.30	.34	.42	.....	18.....	1.41	1.70	2.02	2.52
4 1/2.....	.33	.39	.47	.....	20.....	1.58	1.90	2.26	2.82
5.....	.36	.43	.52	.....	24.....	1.96	2.36	2.80	3.50
6.....	.43	.52	.62	.77	30.....	.....	.....	3.64	4.55
7.....	.51	.60	.73	.91	36.....	.....	.....	4.48	5.60
8.....	.59	.70	.84	1.05					



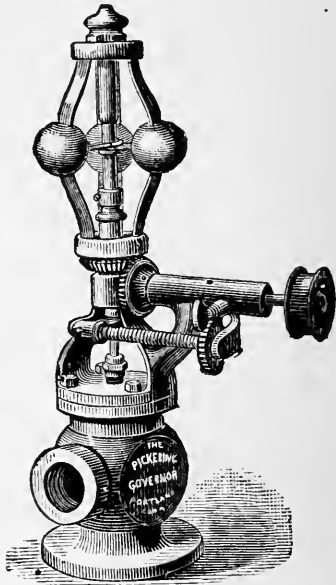
PICKERING'S GOVERNORS.



Class A.—Speeder, Lever and Automatic Stop.

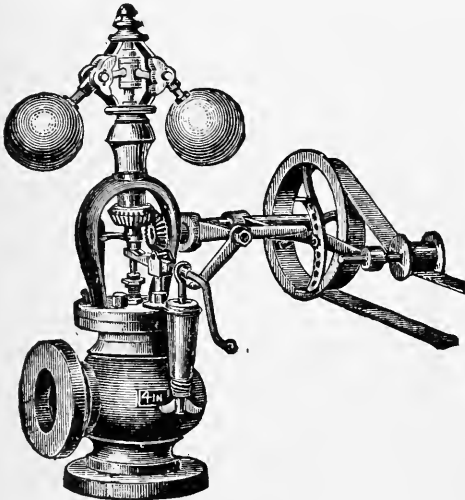


Class B.—Speeder and Sawyer's Lever.



Class B.—With Speeder.

Size.....	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7
B, Plain...	14.00	16.00	18.00	21.00	25.00	30.00	40.00	50.00	60.00	71.00	83.00	94.00	122.00	150.00
B, Finished.	16.00	18.00	20.00	24.00	29.00	34.00	45.00	58.00	69.00	81.00	94.00	106.00	136.00	166.00
A, Plain....		18.50	21.00	24.50	29.50	36.00	48.00	59.00	71.00	83.00	96.00	109.00	140.00	170.00
A, Finished			23.00	27.50	33.50	40.00	53.00	67.00	80.00	93.00	107.00	121.00	154.00	186.00

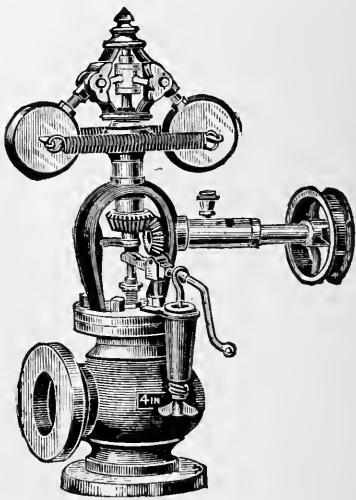


Class A.—Spring. (High Speed).

JUDSON GOVERNORS.

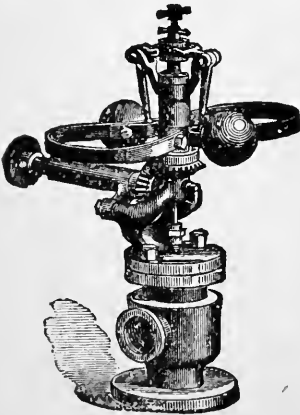
In these Governors the spiral springs are reliable and insure accurate and durable spring action. By removing one spring the engine speed can be greatly reduced, allowing full throw of Governor under all conditions of engine load. In case of accident to one spring the Governor will operate until the spring can be replaced. For convenience in ordering, the Governors are described in two classes—A and B. Workmanship and quality the same. Class A, either Standard or Spring Governor, with Automatic Stop Motion Spring, Speeder and Sawyer's Lever. Class B, same as class A, except without Automatic Stop Motion.

List Prices same as above.



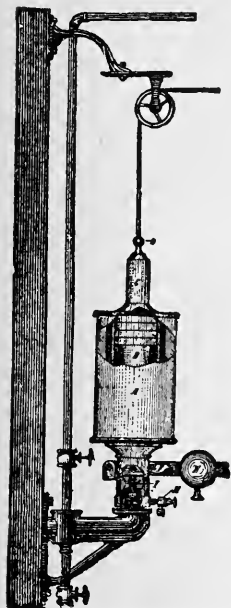
Class B.—Spring. (High Speed).

WATERS' GOVERNOR.



The Waters' Governor has now been in use about thirty years, and has steadily grown in favor since its introduction; the sales have largely increased, and the Governor has been kept up to the high standard of excellence for which it has long been noted. By the theory embodied in its design, it is not affected by the action of gravity, the weights remaining always on the same plane, and as they are supported by the springs which furnish the centripetal force, there is consequently no friction in the joints of the ball arms, they merely serving as levers to operate the valve. Having a valve of large area, greatly in excess of the steam pipe, and being quick acting and sensitive, insures the highest economical results, as well as closeness in regulation. The method of adjusting the speed of the Governor to the requirements of the engine is very convenient. The valves and seats are of composition, which does not rust or corrode. The perfect system of interchangeability of parts greatly facilitates and cheapens the cost of repairs. On account of these features, it is particularly adapted to places where changes are sudden and severe.

List Prices same as above.



## KELLAM'S DAMPER REGULATOR.

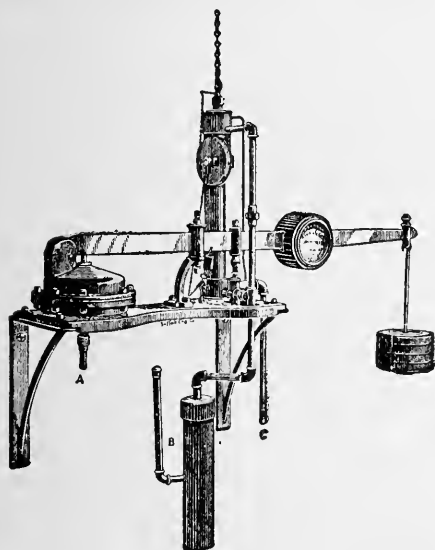
The KELLAM has been a favorite "up to date" machine for several years and has had a very large sale. It is made in two sizes and can be used on any boiler pressure.

No 1.....\$150.00

For dampers 4 feet or over.

No 3.....\$125.00

For dampers up to 4 feet.



## LAWRENCE HYDRAULIC DAMPER REGULATOR

is conceded to be one of the most complete Machines of its kind, as it embodies all the improvements to insure perfect accuracy.

The steam weigher rests on an iron base, and the lever directly operates the water valve, and there is no lost motion.

The water motor being double acting, there is no necessity of having any weights on top of piston. The water valve is fed through a mud-drum which prevents any dirt reaching the water motor; the diaphragm is covered with cool water which keeps it always flexible.

Will control one or more Dampers as required.

Very Sensitive and Powerful, making a partial stroke in both directions by water pressure.

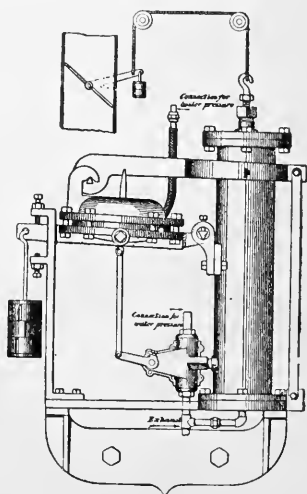
Easy to repair, and Simple in Construction.

Manufactured under the Locke Patents, Complete, Each.....\$100.00

## CLIMAX DAMPER REGULATOR.

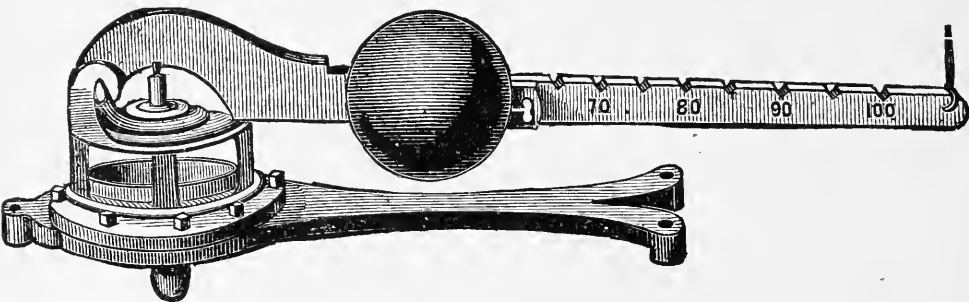
The damper in the flue is closed by the downward motion of the piston, and it is therefore necessary to apply sufficient weight to the damper level to cause it to open the damper, and at the same time pull up the piston, which it will do immediately after a slight reduction in the steam pressure, which causes a downward movement of the diaphragm casing, and a corresponding movement in the valve, whereby the inlet port is closed and the exhaust port opened, which allows the water in the cylinder to escape, thus enabling the weight on the damper lever to open the damper, and at the same time pull up the piston. In this position the damper will remain until the steam pressure increases slightly, which causes an upward motion of the diaphragm casing, the corresponding motion in the valve causing the exhaust port to close and the inlet port to open through which the water enters the cylinder and drives the piston down, thereby closing the damper.

Price.....Each, complete, \$150.00



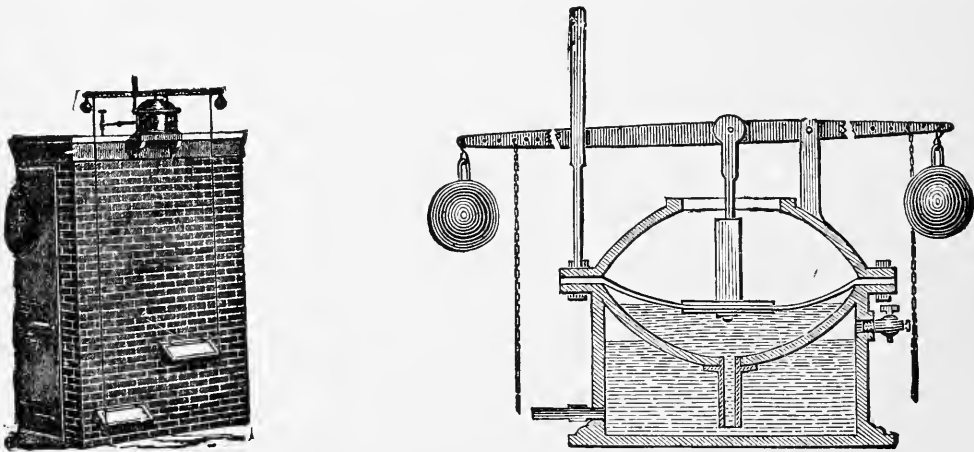
STEAM DAMPERS OR DRAFT REGULATORS.

FOR HIGH PRESSURE.

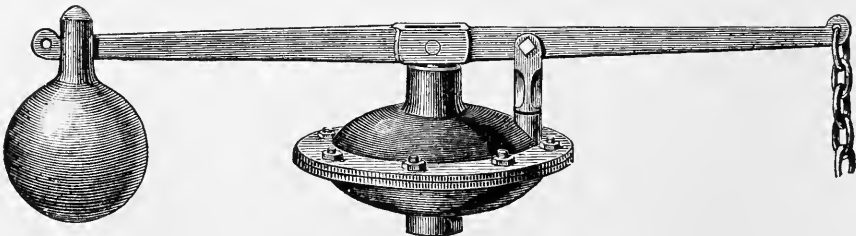


Numbers.	1	2	3
For Boilers, Horse Power and under.....	5	20	30
Price.....	10.00	15.00	25.00
Rubber Diaphragms.....	1.00	1.50	2.50

DAMPER REGULATORS FOR LOW PRESSURE.



NASON'S LOW PRESSURE REGULATOR, WITH COLD WATER RESERVOIR,  
AND WITH INDEPENDENT DOORS.

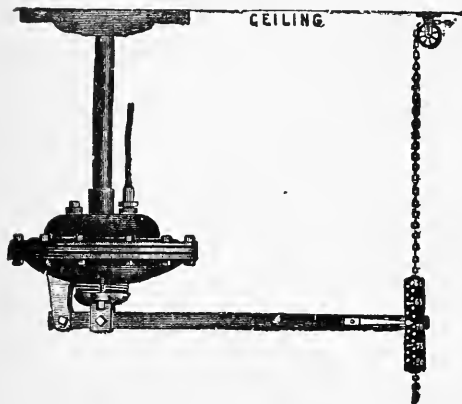


CHEAP PATTERN LOW PRESSURE DAMPER REGULATOR.

Nason's with Cold Water Reservoir and with Independent Doors.....	15.00
“ “ “ “ without Doors.....	12.00
Cheap Pattern, 7 inch plates.....	5.00
“ 9 “ .....	7.50



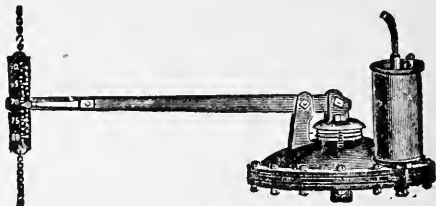
THE POWERS TEMPERATURE REGULATOR.



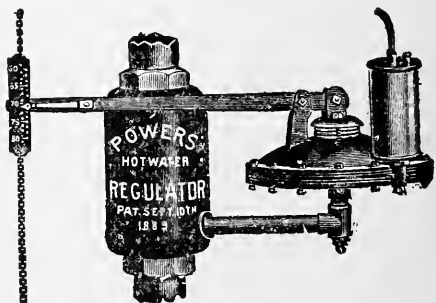
No. 2.  
Used with Thermostat for Hot Air  
Furnace.  
Each ----- \$40.00



THERMOSTAT.

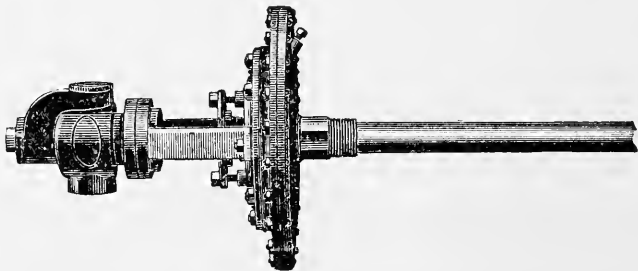


No. 3.  
Used with Thermostat for Steam  
Heaters.  
Each ----- \$45.00



No. 4.  
Used with Thermostat for Hot Water  
Heaters.  
Each ----- \$50.00  
Add for double lever attachment  
to operate twin heaters ----- 2.00  
Regulators as above listed are fur-  
nished complete with thermostat, tubing,  
chains, pulleys, etc.

This Regulator is easily applied to  
any kind of a house heating apparatus.  
It will automatically control the drafts,  
maintaining a uniform temperature in  
the living rooms, and with the greatest  
possible economy in fuel.



No. 8.

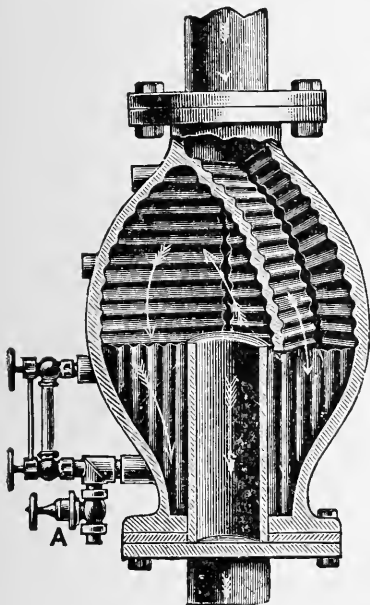
REGULATOR FOR STEAM HEATED HOT WATER TANKS.

Automatically controls the temperature of the hot water supply.

PRICE LIST.					
No. 8 Tank Regulator,	1	inch	steam	valve	\$70.00
No. 8 "	"	1 1/4	"	"	75.00
No. 8 "	"	1 1/2	"	"	80.00
No. 8 "	"	2	"	"	90.00

THE HINE ELIMINATOR.

FOR EXPELLING OIL, GREASE AND GRIT FROM EXHAUST, AND ENTRAINED  
WATER FROM LIVE STEAM.



Vertical where course of the  
steam is downward.

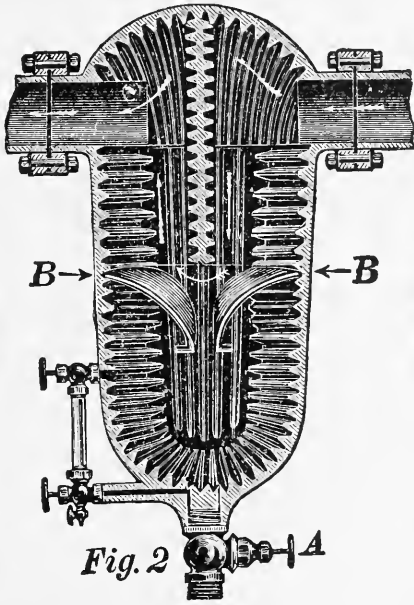
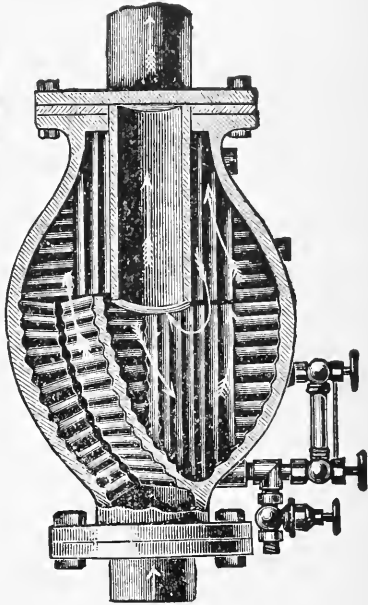


Fig. 2 Improved Horizontal.



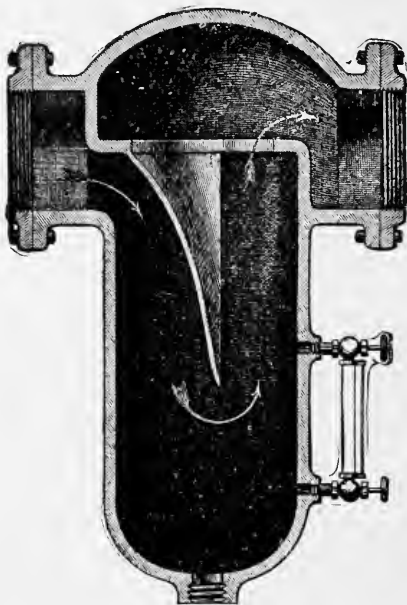
Vertical where course of the  
steam is upward.

Made in three patterns and adapted to all conditions, either for separating water from live steam  
or extracting oil from exhaust steam. All are sent out with a full guarantee.

HORIZONTAL—Price for Vertical same as Horizontal.							VERTICAL.				
Size of Pipe.	Price.	Face to Face.	Top to Centre.	Centre to Bottom.	Diameter of Flanges.	Drip.	Face to Face.	Diameter of Body.	Diameter of Small Flanges.	Diameter of Large Flanges.	Drip.
		inches	inches	inches	inches	inches	inches	inches	inches	inches	
1	\$20 00	10	2 <sup>7</sup> / <sub>8</sub>	12 <sup>7</sup> / <sub>8</sub>	5	3 <sup>3</sup> / <sub>4</sub>	16 <sup>1</sup> / <sub>2</sub>	8	6	6	3 <sup>3</sup> / <sub>4</sub>
1 <sup>1</sup> / <sub>4</sub>	20 00	11 <sup>1</sup> / <sub>8</sub>	3	16 <sup>1</sup> / <sub>4</sub>	6	3 <sup>3</sup> / <sub>4</sub>	20 <sup>1</sup> / <sub>4</sub>	10	7	8	3 <sup>3</sup> / <sub>4</sub>
1 <sup>1</sup> / <sub>2</sub>	25 00	11 <sup>1</sup> / <sub>8</sub>	3	16 <sup>1</sup> / <sub>4</sub>	6	3 <sup>3</sup> / <sub>4</sub>	20 <sup>1</sup> / <sub>4</sub>	10	7	8	3 <sup>3</sup> / <sub>4</sub>
2	30 00	11	3 <sup>3</sup> / <sub>4</sub>	22 <sup>1</sup> / <sub>2</sub>	7	3 <sup>3</sup> / <sub>4</sub>	22 <sup>3</sup> / <sub>4</sub>	12	8	9	3 <sup>3</sup> / <sub>4</sub>
2 <sup>1</sup> / <sub>2</sub>	35 00	11	3 <sup>3</sup> / <sub>4</sub>	22 <sup>1</sup> / <sub>2</sub>	7	3 <sup>3</sup> / <sub>4</sub>	22 <sup>3</sup> / <sub>4</sub>	12	8	9	3 <sup>3</sup> / <sub>4</sub>
3	45 00	14 <sup>1</sup> / <sub>4</sub>	4 <sup>7</sup> / <sub>8</sub>	25 <sup>7</sup> / <sub>8</sub>	8	1	24 <sup>1</sup> / <sub>2</sub>	12 <sup>1</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub>	11	1
3 <sup>1</sup> / <sub>2</sub>	52 00	14 <sup>1</sup> / <sub>4</sub>	4 <sup>7</sup> / <sub>8</sub>	25 <sup>7</sup> / <sub>8</sub>	8	1	24 <sup>1</sup> / <sub>2</sub>	12 <sup>1</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub>	11	1
4	64 00	16 <sup>1</sup> / <sub>2</sub>	5	30 <sup>1</sup> / <sub>2</sub>	9 <sup>1</sup> / <sub>2</sub>	1	26 <sup>1</sup> / <sub>2</sub>	17	11	13	1
4 <sup>1</sup> / <sub>2</sub>	72 00	16 <sup>1</sup> / <sub>2</sub>	5	30 <sup>1</sup> / <sub>2</sub>	9 <sup>1</sup> / <sub>2</sub>	1	26 <sup>1</sup> / <sub>2</sub>	17	11	13	1
5	83 00	17 <sup>3</sup> / <sub>4</sub>	5 <sup>5</sup> / <sub>8</sub>	28	10	1 <sup>1</sup> / <sub>4</sub>	28 <sup>1</sup> / <sub>4</sub>	19	13	15 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>
6	104 00	17 <sup>7</sup> / <sub>8</sub>	6	32	11	1 <sup>1</sup> / <sub>4</sub>	28 <sup>1</sup> / <sub>4</sub>	19	13	15 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>
7	120 00	20 <sup>3</sup> / <sub>4</sub>	7 <sup>7</sup> / <sub>8</sub>	34 <sup>1</sup> / <sub>8</sub>	13	1 <sup>1</sup> / <sub>4</sub>	36 <sup>1</sup> / <sub>4</sub>	22 <sup>7</sup> / <sub>8</sub>	14 <sup>3</sup> / <sub>4</sub>	17	1 <sup>1</sup> / <sub>2</sub>
8	145 00	20 <sup>3</sup> / <sub>4</sub>	7 <sup>7</sup> / <sub>8</sub>	34 <sup>1</sup> / <sub>8</sub>	13	1 <sup>1</sup> / <sub>4</sub>	36 <sup>1</sup> / <sub>4</sub>	22 <sup>7</sup> / <sub>8</sub>	14 <sup>3</sup> / <sub>4</sub>	17	1 <sup>1</sup> / <sub>2</sub>
9	165 00	24 <sup>7</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>4</sub>	29 <sup>3</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	43 <sup>3</sup> / <sub>8</sub>	28	17	20	1 <sup>1</sup> / <sub>2</sub>
10	185 00	24 <sup>7</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>4</sub>	29 <sup>3</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	43 <sup>3</sup> / <sub>8</sub>	28	17	20	1 <sup>1</sup> / <sub>2</sub>
12	215 00	28 <sup>7</sup> / <sub>8</sub>	11 <sup>1</sup> / <sub>8</sub>	33 <sup>3</sup> / <sub>4</sub>	19 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	---	---	---	---	---

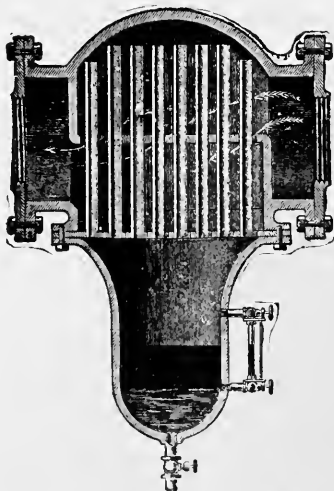
These prices include Companion Flanges, Bolts and Water Gauge.

KIELEY'S  
IMPROVED STEAM AND WATER SEPARATOR.



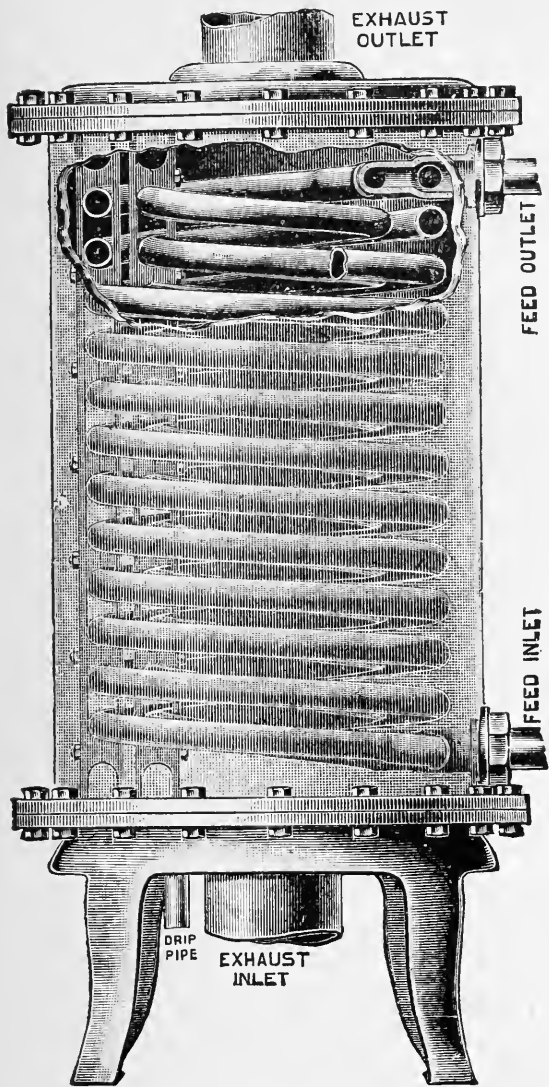
Size.....	1¼	1½	2	2½	3	4	5
Diameter Flanges.....	5	6	7	8	10	11	12
Face to Face Flanges.....	5	6	7⅞	8¾	10½	12¼	14
Each.....	\$20.00	25.00	30.00	35.00	45.00	64.00	83.00
Size.....	6	7	8	9	10	12	
Diameter Flanges.....	13	13½	14	15	16	19	
Face to Face Flanges.....	15	15½	16	17½	19¼	22	
Each.....	\$104.00	120.00	145.00	165.00	200.00	250.00	

KIELEY'S MULTI-TUBULAR OIL SEPARATOR.



Size.....	1¼	1½	2	2½	3	4	5
Diameter Flanges.....	5	6	7	8	10	11	12
Face to Face Flanges.....	5	6	7⅞	8¾	10½	12¼	14
Each.....	\$20.00	25.00	30.00	35.00	45.00	64.00	83.00
Size.....	6	7	8	9	10	12	
Diameter Flanges.....	13	13½	14	15	16	19	
Face to Face Flanges.....	15	15½	16	17½	19¼	22	
Each.....	\$104.00	120.00	145.00	165.00	200.00	250.00	



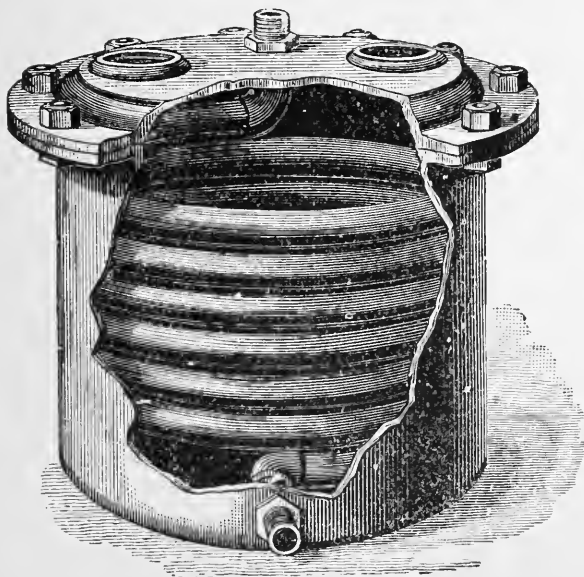


AMERICAN FEED  
WATER HEATERS.

No.	Horse Power.	Diam. of Feed Inches.	Diam. of Exhaust Inches.	Extreme Height Inches.	Extreme Diam. Inches.	Price.	Style of Shell.
0	5	$\frac{3}{8}$	$1\frac{1}{2}$	13	9	15	CAST IRON.
1	10	$\frac{1}{2}$	2	17	9	20	
2	15	$\frac{3}{4}$	$2\frac{1}{2}$	17	12	30	
3	20	$\frac{3}{4}$	$2\frac{1}{2}$	21	12	40	
4	25	1	3	23	16	50	
5	30	1	$3\frac{1}{2}$	29	18	60	
6	40	1	4	32	18	80	
7	50	$1\frac{1}{4}$	4	37	20	100	
8	60	$1\frac{1}{4}$	4	41	20	110	
9	80	$1\frac{1}{4}$	5	45	20	130	
10	100	$1\frac{1}{4}$	5	50	20	150	
11	125	$1\frac{1}{2}$	6	45	24	175	
12	150	$1\frac{1}{2}$	6	52	24	220	
13	200	2	8	55	27	280	
14	250	2	8	60	27	340	
15	300	$2\frac{1}{2}$	10	63	34	400	
16	400	$2\frac{1}{2}$	10	69	34	500	STEEL.
17	500	$2\frac{1}{2}$	10	76	34	600	
18	600	3	12	77	38	700	
19	800	$3\frac{1}{2}$	12	80	48	1000	
20	1000	4	16	84	56	1500	
21	1250	4	18	90	56	1750	

Estimates given on larger sizes to order.

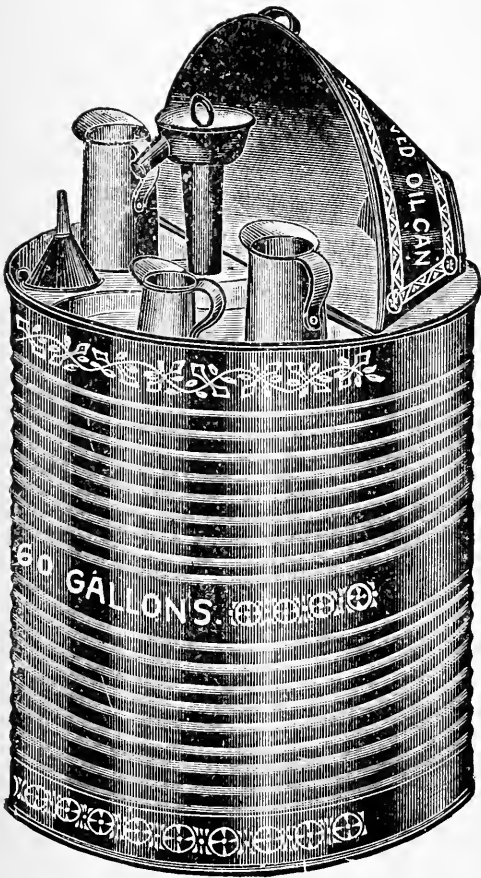
NASON FEED WATER HEATER, CAST IRON.  
WITH IRON PIPE COIL.



FOR EXHAUST STEAM ONLY.

Number.....	1	2	3	4	5
Size of Pipe.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Dia. Cyl. in....	$12\frac{1}{4}$	$14\frac{1}{4}$	$16\frac{3}{4}$	$20\frac{1}{4}$	24
Height Cyl., ...	12	14	$16\frac{1}{2}$	20	24
Ft. Pipe in Coil.	15	17	24	35	46
Ex. Outlet, in...	2	$2\frac{1}{2}$	3	4	6
Horse Power...	10	20	30	50	70
Price.....	\$20.00	30.00	45.00	80.00	130.00

BALTIMORE OIL CANS.



The tops are galvanized, the bodies kalamined (that is, coated with spelter and lead, lead preponderating), making them last longer and less liable to rust than if all spelter (galvanizing) were used.

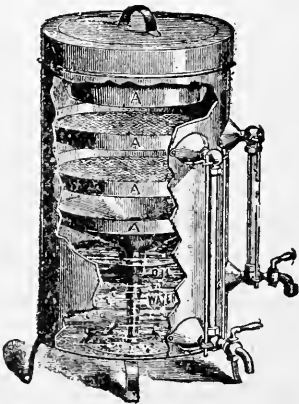
The bodies and bottoms are corrugated and united in such a manner as to give the greatest strength and durability.

Size, Gallons....	30	60	106
Each .....	\$5.30	\$6.30	\$10.50

The pumps in all our cans are detachable, and can be used for pumping oil from the barrels into the cans.

WASTE OIL FILTER.

Simple, Easily Cleaned,  
Automatic.



Effective, Reclaims Old Oil,  
Practical.

Made in Three Sizes.

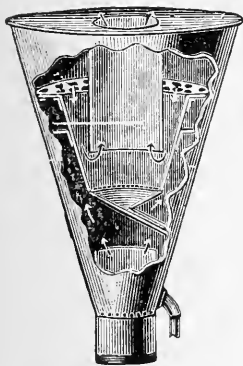
15 Galls.....	\$18.00	30 Galls.....	\$30.00	60 Galls.....	\$45.00
---------------	---------	---------------	---------	---------------	---------

Neatly Japanned.

Brass Trimmings.

ROBERTSON'S EXHAUST PIPE HEAD.

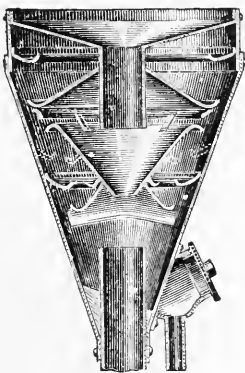
(PATENTED.)



Is built on correct principles, of heavy galvanized iron throughout, and will perform its duty to the satisfaction of every one.

1	inch	----\$18.00	4	inches	----\$40.00	10	inches	----\$125.00
1½	inches	---- 22.00	4½	"	---- 45.00	12	"	---- 150.00
2	"	---- 25.00	5	"	---- 50.00	14	"	---- 180.00
2½	"	---- 28.00	6	"	---- 60.00	16	"	---- 220.00
3	"	---- 30.00	7	"	---- 70.00	18	"	---- 300.00
3½	"	---- 35.00	8	"	---- 85.00	20	"	---- 360.00
			9	"	---- 105.00			

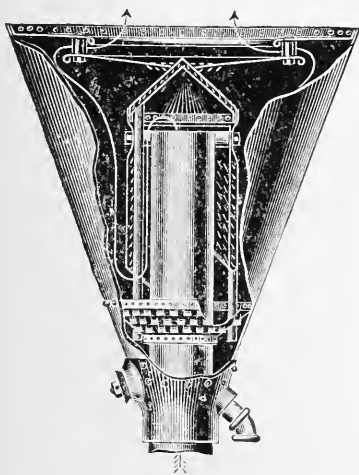
LYMAN EXHAUST HEAD.



Pipe Size, Inches	1 or 1½	2 or 2½	3 or 3½	4 or 4½	5	6	7	8	9	10	11 or 12	13	14	15	16	17	18
Price	\$20	25	30	40	50	60	75	90	105	125	150	175	200	235	250	270	300
Drip Outlet to Head, in.	1¼	1¼	1½	1½	2	2	2	2½	2½	2½	3	3	3	3½	3½	4	4
First Section of Drip Reduced to in.	¾	¾ or 1	¾ or 1	1	1 or 1¼	1 or 1¼	1 or 1¼	1¼ or 1½	1¼ or 1½	1½ or 2	1½ or 2	2 or 2½	2 or 2½	2½ or 3	2½ or 3	3 or 3½	3 or 3½

Prices 20 to 48 inch on application.

SWEET'S EXHAUST HEAD.



The accompanying cut shows a Sweet's Direct Exhaust Head, which is constructed upon a principle that has been demonstrated by years of use to give absolute separation. The steam enters to the inner side of an inverted cup, and, as it passes downward between the sides of the inlet pipe and the cup, is brought in contact with a peculiarly perforated lining which quickly separates and traps the little particles of water and oil. As the area is ample the current of steam can be made thin, so that nearly all of it comes in contact with the lining, and most of the water and oil removed this way, but any that may remain is thrown to the water chamber by the quick reversing of the direction of steam current as it passes up and out of head. Tubes are provided to convey any moisture caught on the covers to the water chamber; tubes are also provided to conduct the oil and moisture caught by the lining above-mentioned to the water chamber; in fact, the principle followed throughout is to completely remove separated particles from further contact with steam. The Heads are made heavy and strong and fully guaranteed by the makers in every way.

Size Pipe..	1 & 1½	2 & 2½	3 & 3½	4 & 4½	5	6	7	8	9	10	11	12	14	16	18
Each.....	\$20 00	25.00	30 00	40.00	50.00	60.00	75.00	90.00	105.00	125 00	150.00	150.00	200.00	250 00	300.00

## THE NASON STEAM TRAPS.

### THE "NASON" TRAPS.

••○◇○••



(Size No. 1.)

For Pressures of 80 lbs. or less

### THE "SIDELUG" TRAPS.

(Patented)



(Size No. 1.)

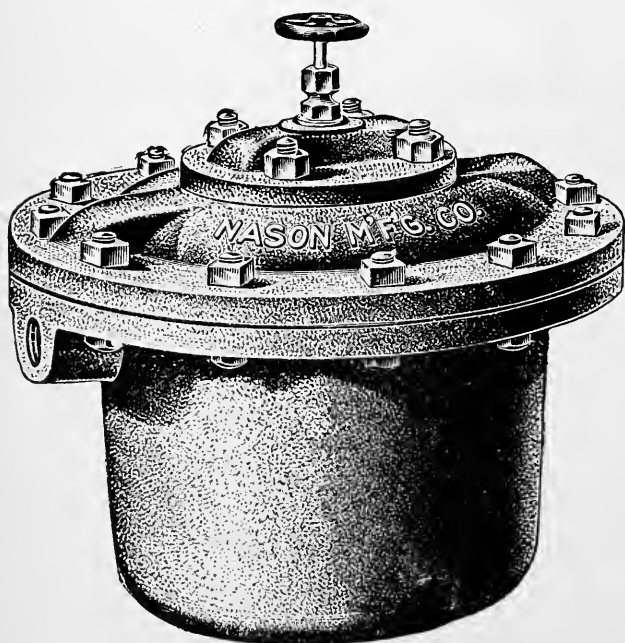
For Pressures ranging from 80 to 150 lbs.

### PLEASE READ THIS.

The steam traps manufactured by the Nason Manufacturing Company have always enjoyed the reputation of being the best of their kind—more extensively known and used than any other—in fact the standard of excellence with steam-fitters and engineers in all parts of the country.

Following the demand made by modern steam engineering for higher pressures, it has been thought judicious to divide the Nason traps into two groups, one for ordinary working steam pressures of 80 lbs. and less; the other for pressures above 80 and less than 150 lbs. For the lower pressures no change of design has been made, the high standard of construction and good workmanship being, as in the past, fully maintained; these traps will continue to be known and specified as the NASON steam trap.

### THE "NASON" TRAPS.



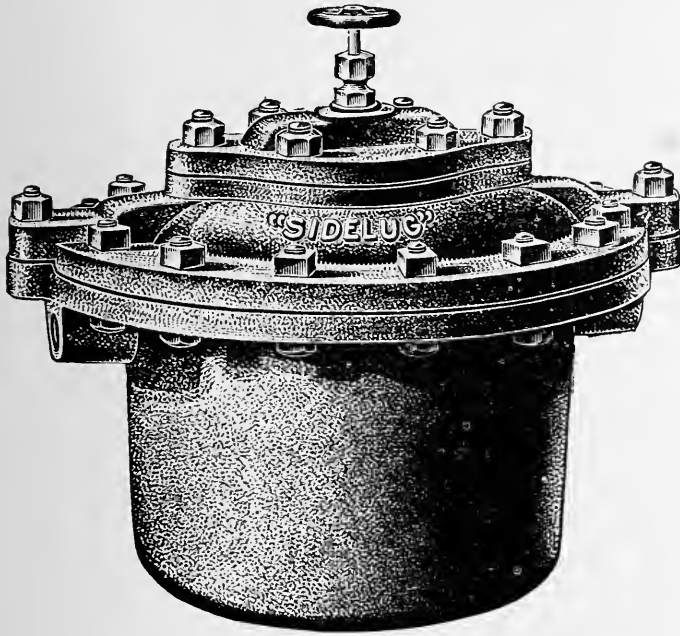
(Sizes No. 4 and 5.)

For higher pressures a radical departure in construction of the covers has been designed and patented, consisting of so reinforcing the joints at the point of inlet and outlet where the steam ports pass from pots to covers, that leaks near these places cannot occur, there being no possibility of the gaskets blowing out. A considerable increase in the number of bolts used for each size has been adopted, thus rendering these traps not only amply equal to the extreme work imposed upon them, but infinitely better than anything hitherto made in this class of trap. These traps are known as the Nason "SIDELUG" trap, and should be universally specified in all cases where they are to be used in connection with pressures exceeding 80 lbs.

For facility of access to the sleeve

# THE "SIDELUG" TRAP.

(Patented.)



(Sizes Nos. 4 and 5.)

seats and sleeves, the two larger sizes (Nos. 4 and 5) are fitted with hand-hole plates on the covers, which permits of readily getting at the working parts without breaking the main joint.

## CONSTRUCTION

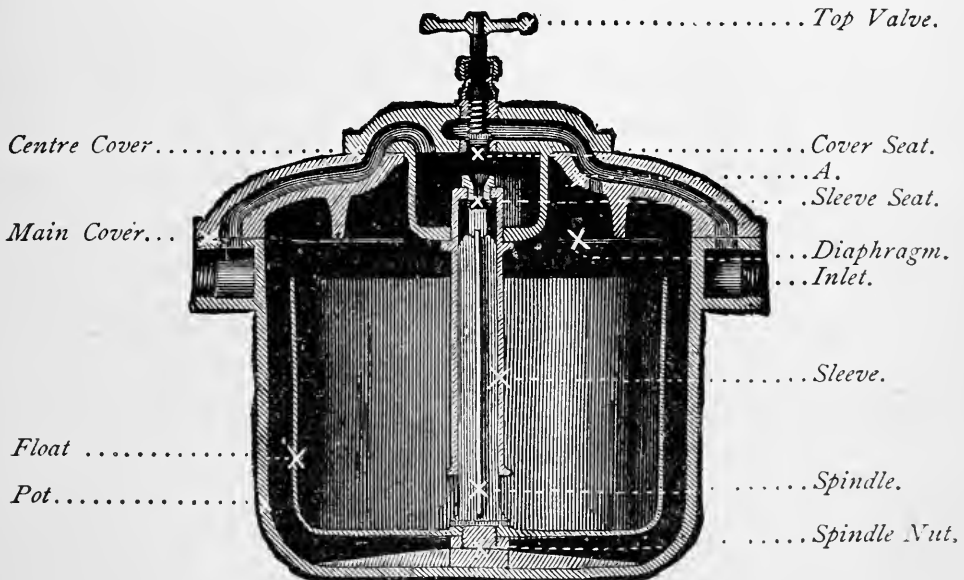
OF THE NASON AND SIDELUG TRAPS.

Reference to the sectional cut shows the construction of the Nason traps as follows :

A cast-iron reservoir or pot closed with a cover provided with two cored passages, contains a float which is fitted with a spindle for its guidance. A housing or sleeve is screwed centrally into the under side of the cover and within it the float spindle slides smoothly, permitting a short vertical motion. The top of the float-spindle is ground flat, and its upward movement is arrested by coming in contact with a bronze plug having a

central opening, the two surfaces thus constituting a discharge valve for these traps.

One of the cored passages in the cover alluded to is for the discharge of water from the traps after passing through the main valve, and the other serves as a by-pass, to permit any large volume of air or water to be blown through, when starting, without going through the cylinder and discharge valve. A valve located externally in the cover gives entire control of this action.



## SECTION.

Showing the interior of the "Nason" and "Sidelug" traps with names of parts. If new portions are at any time wanted they should be ordered by the names as given.

OPERATION.

Care being taken that the Traps are in all cases placed below the surface from which water of condensation flows, the discharge enters at the point marked "Inlet," and passing through the hole "A" into the body of the Traps, a Diaphragm above the float diverts the water of condensation into the pot, where, gradually rising, it first raises the float, thereby closing the discharge valve, and then after reaching the top of the float it flows in o it. When the float has nearly filled, its weight becomes such that it overcomes the tendency of the discharge valve to remain closed, being held there by steam pressure, and the float drops to the bottom, thereby opening the valve. Acting on the surface of the water, the steam pressure immediately drives it up through the sleeve, discharge valve, and thence by way of the cored passage to the outlet.

When the float has been thus nearly emptied it becomesso light that it is again raised by the water about it, thus closing the valve, and the operation repeats itself.

This action it will be seen is purposely intermittent; which necessitates that the valve shall be either wide open or completely closed, an advantage which entirely obviates the "wire drawing" process to which all other traps of the ball-cock style are subject. The life of the valve is thus prolonged, and it remains tight for a much longer period than it otherwise would.

As will be seen, the Nason and Sidelug Traps have no motive power within themselves, and they are not Return Traps; water must run into them by gravitation, and the discharge from them should preferably be into the open air or a hot-well.

Under certain conditions the discharge may be considerably elevated above the level of the Traps, such lif being fixed by the amount of steam pressure to which it is connected; but in these cases an automatic appliance for removing air which accumulates between the steam surface and the Traps must be provided, and such service is not recommended.

PLEASE NOTE.—In ordering either NASON or SIDELUG Traps it is important that the steam pressure under which they are to be used should be stated, in order that the sleeve seat valves shall be of a size which is adapted to the duty.

All traps issued by us are tagged and marked with the pressures for which their sleeve valves are fitted. If used for higher pressure than that stated on the tag, failure of operation may result, for which we are in no way responsible.

The following table shows the number of square feet of heating surface in a common high pressure Steam Heating Apparatus, which Traps of the several sizes may be expected to relieve under ordinary exposure to cooling:

NUMBER OF STEAM TRAP.....	1	2	3	4	5
Size of Pipe Connections.....inch	1½	3¼	1	1¼	1½
Diameter outside of Flanges..... "	10¾	14¼	15¾	19	24¼
Diameter of Cylinder..... "	8	10½	12	14	18
Height to top of Valve..... "	11	14	16¼	18½	23½
Height to top of Cover..... "	8	10	12	14	15½
Maximum discharge lbs. water per min..	2	5	8	12	20
Greatest number of square feet of surface to which it should be applied.....	350	900	1400	2000	3500
Greatest number of lineal feet of 1-in. pipe surface to which it should be applied...	1050	2700	4200	6000	10500
Weight, lbs. "Nason".....	40	80	113	176	336
Weight, lbs. "Sidelug".....	47	92	125	212	343
Price, "Nason".....	\$16.00	\$20.00	\$27.50	\$42.50	\$70.00
Price, "Sidelug".....	16.85	21.30	29.25	45.50	74.75

For indirect Steam Heating Apparatus the size of the Trap used should be at least 40 per cent. larger than that given in the table, and if the coils are under the action of a blast from a fan or blower the size of Trap must be still further largely increased.

For special service, such as separators, vacuum pans, slashers, or for steam coils immersed in water, the number of square feet given in the table cannot be taken as an index of the size to be used. The amount of water to be discharged must be otherwise estimated, preferably by weighing the amount collected per minute, and the size selected by this method from the table.



## DIRECTIONS FOR USING THE "NASON" AND "SIDELUG" STEAM TRAPS.

FIRST.—Be sure that the Trap is not to be used for higher pressure than that marked on its tag.

SECOND.—Screw the valve bonnet which accompanies the trap into the hole on top, being careful that before doing so the spindle is backed out as far as possible, in order to avoid crushing the seat on the disc.

THIRD.—Place the Trap in all cases below the lowest point which is to be drained.

FOURTH.—Connect the drip pipe from end of coils of apparatus to the opening marked "Inlet."

FIFTH.—Open the valve on top for a few minutes to allow the air or excess of water coming from the apparatus to escape.

SIXTH.—When the steam begins to flow in considerable quantity close the valve tight and allow it to remain so while the trap is in operation. If while the pressure is on the coils, they become cold or water stops escaping from the trap, it is usually due to an accumulation of air. In this case open the valve a few minutes to allow it to escape, and then again close it.

SEVENTH.—The trap is tested and guaranteed to work up to the pressure marked on its tag. If more, or much less, are required, it should be so specified, in order that the valve may be adapted to such requirements.

EIGHTH.—This trap will discharge water from its outlet a few feet above the elevation on which it is placed—depending on the pressure; but it will NOT RETURN WATER TO THE BOILER—not being made for this purpose.

NINTH.—If the apparatus or trap is to be left inoperative at any time when the temperature is likely to go below the freezing point, remove the plug at the bottom, in order to allow the water contained in it to escape, and thus avoid damage to trap.

This trap is guaranteed only to drain the number of square feet specified in our table, when the surface consists of Radiators, Wall Coils, or similar surface, acting only on the direct system.

If connected to a heating apparatus on the indirect system, a trap 40 per cent. larger should be used. If connected to Sugar Pans, Evaporators, Separators, or apparatus where the heating surface is under water, the condensation is much more rapid, and surface, as named in our table, is not to be used as giving the capacity of the trap. For exceptional work, we will name special sizes and prices for traps to be used.

## SERVICE TO WHICH THEY MAY BE APPLIED.

For taking off the water of condensation for Steam Pipes and Coils, and apparatus employed in Steam Heating.

For draining Steam Kettles, Vacuum Pans, Mash Kettles, Steam Engine Supply Pipes, and Separators, and keeping Cylinders free from water; Evaporating Pans, Steam Jackets on Engines, Steam Jackets on Pumps, Stills in Absorption Ice Machinery, etc., etc.

These traps are recommended for any service requiring the removal of water of condensation without the escape of steam accompanying it.

A large assortment of standard sizes is kept in stock, which can be modified to suit any usual condition of service by changing their discharge valves, an operation only requiring a few minutes, and orders are thus usually filled on the date of their receipt.

PLEASE NOTE.—All traps manufactured by us bear the name "NASON M'FG CO.," on the cover, and customers are requested to insist on this mark, as several inferior and light imitations are on the market and sold as our trap, which are giving general dissatisfaction, and causing prejudice against those of our make. Again we say,

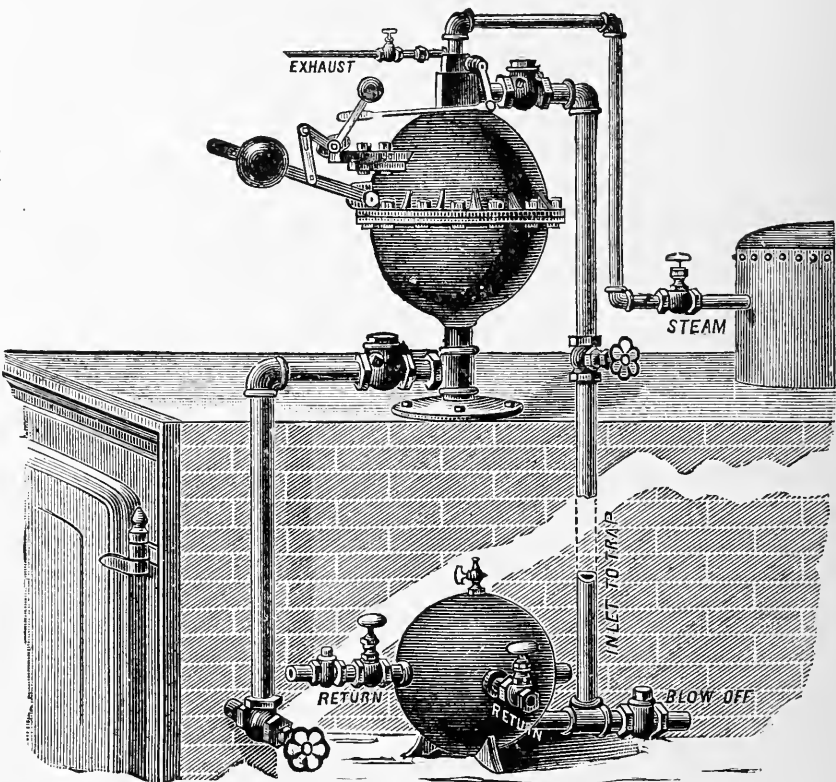
## AVOID SUBSTITUTION.



# THE CHAMPION RETURN STEAM TRAP AND BOILER FEEDER.

For returning condensation to Boilers from Steam Heaters of all kinds, Drying Cylinders, Evaporating Pans, Brewing Kettles, Paper Dryers, etc., whether above or below the Boiler.

The Champion Return Steam Trap and Boiler Feeder is operated by the buoyancy of a Cast Iron Ball, alternately surrounded by water, and connected by a spindle to a lever on the outside, thereby operating a steam and exhaust valve both in one chamber, and placed on top of the Trap in such a position as to exhaust freely when desired, and reduce the pressure so as to enable the Trap to take water immediately and prevent it from becoming air bound. The Trap will also take condensation from two or more return pipes, on some of which the pressure may be as low as five pounds and others as high as one hundred pounds, without causing the least obstruction to the return pipe upon which the pressure is low. This Trap is in operation in a large number of buildings in New York and elsewhere.

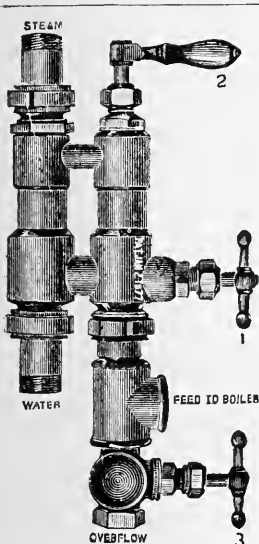


No. 1.—to drain	4,000 to 5,000 feet,	1 inch pipe,	Inlet 1 inch,	Discharge 1½ inch.....	\$100.00
No. 2.—	8,000 to 10,000 "	" " " "	" 1¼ "	" 2 " .....	150.00
No. 3.—	15,000 to 20,000 "	" " " "	" 1½ "	" 2½ " .....	200.00
No. 4.—	30,000 to 40,000 "	" " " "	" 2½ "	" 3 or 4 " .....	300.00
Receivers. ....			10.00,	16.00,	24.00 and 4c.00
Outlets of Receivers.....			1 in.	1¼ in.	1½ in. 2½ in.

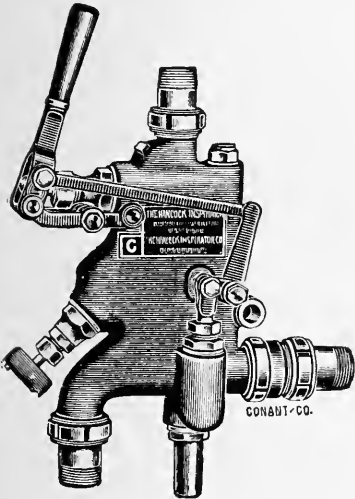
## DIRECTIONS FOR CONNECTING TRAP.

1. Always take steam direct from boiler.
2. Always place trap at least from 2½ to 3 feet above the water level of boiler.
3. Always connect discharge pipe from trap to boiler, independent of any other discharge.
4. Always place receiver below the lowest radiator.
5. Place ball on lever just far enough out so as to let the float come to the bottom when trap is empty.
6. Never reduce steam pipe leading from boiler to trap.
7. Never use lead when making joints or connections.
8. It will be necessary to set up two or three different times on flange-bolts, when trap becomes cold.
9. I would advise the use of swing checks, as giving better results.
10. Always place trap so that it can easily be got at, and have the gear in front.
11. Always be careful not to deviate too much from the style and mode of connection as illustrated in cut.
12. When everything is connected, before starting trap, compare with directions to make sure that everything is as it should be.

THE HANCOCK INSPIRATOR.  
"STATIONARY" PATTERN.

	2			Capacities per Hour.		Pipe Connections.			
	Size.	Price.	With 60 Lbs. Steam Pressure and 4-Ft. Lift.	Maximum Horse Power.	Steam.	Suction.	Delivery.	Over-flow.	
	No.								
	8 <sup>3</sup> / <sub>4</sub>	\$18.00	90 gals.	25	3/8	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	3/8	
	10	20.00	120 "	33	3/8	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	3/8	
	12 <sup>1</sup> / <sub>2</sub>	25.00	220 "	61	1/2	3/4	3/4	1/2	
	15	30.00	300 "	83	1/2	3/4	3/4	1/2	
	17 <sup>1</sup> / <sub>2</sub>	40.00	420 "	117	3/4	I	I	3/4	
	20	45.00	540 "	150	3/4	I	I	3/4	
	22 <sup>1</sup> / <sub>2</sub>	55.00	720 "	200	I	I <sup>1</sup> / <sub>4</sub>	I <sup>1</sup> / <sub>4</sub>	I	
	25	60.00	900 "	250	I	I <sup>1</sup> / <sub>4</sub>	I <sup>1</sup> / <sub>4</sub>	I	
	30	75.00	1,260 "	350	I <sup>1</sup> / <sub>4</sub>	I <sup>1</sup> / <sub>2</sub>	I <sup>1</sup> / <sub>2</sub>	I <sup>1</sup> / <sub>4</sub>	
	35	90.00	1,740 "	483	I <sup>1</sup> / <sub>4</sub>	I <sup>1</sup> / <sub>2</sub>	I <sup>1</sup> / <sub>2</sub>	I <sup>1</sup> / <sub>4</sub>	
	40	110.00	2,230 "	619	I <sup>1</sup> / <sub>2</sub>	2	2	I <sup>1</sup> / <sub>2</sub>	
	45	125.00	2,820 "	783	I <sup>1</sup> / <sub>2</sub>	2	2	I <sup>1</sup> / <sub>2</sub>	
	50	150.00	3,480 "	967	2	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	2	
55	175.00	3,650 "	1014	2	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	2		

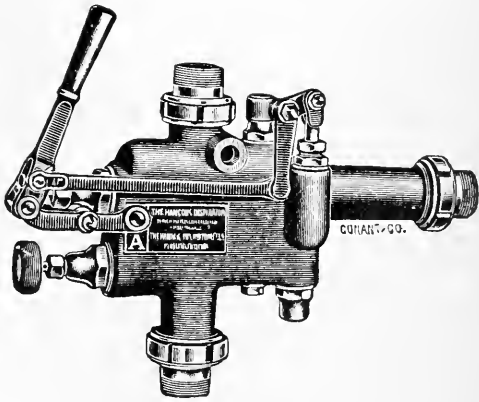
TYPES "C" AND "A."



Type "C."

Type "C" is made in the *upright* and Type "A" in the *horizontal* pattern; both being identical in construction and efficiency and corresponding sizes having the same capacities. Each and every corresponding part of both Types is *inter-changeable* with the exception of the Body.

These Inspirators will work with steam pressures of from 25 to 200 lbs. and higher, *without any adjustment* of either steam or water supply, and will work water at a temperature of 120° Fahr.



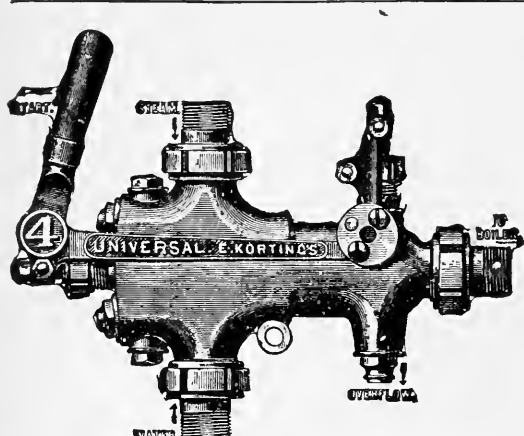
Type "A."

TYPES "C" AND "A."

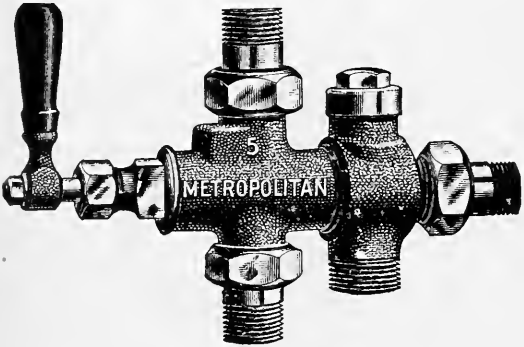
Size.	Type.	Price.	Capacity per Hour With 4 Foot Lift.		Maximum Horse Power. 100 Lbs.	Pipe Connections.			
			Steam Pressures.			Steam.	Suction.	Deliv- ery.	Over- flow.
			60 Lbs.	100 Lbs.					
10	"C"	\$18.00	120 gals.	135 gals.	33	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
12½	"C"	20.00	220 "	245 "	68	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
15	"C"	25.00	300 "	340 "	94	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
17½	"C"	30.00	420 "	475 "	132	$\frac{3}{4}$	I	I	I
20	"C"	40.00	540 "	610 "	169	$\frac{3}{4}$	I	I	I
25	"A"	50.00	900 "	1,020 "	283	1¼	1¼	1¼	1¼
30	"A"	60.00	1,260 "	1,430 "	397	1½	1½	1½	1½
35	"A"	75.00	1,740 "	1,975 "	549	1½	1½	1½	1½
40	"A"	90.00	2,230 "	2,530 "	703	2	2	2	1½
45	"A"	110.00	2,820 "	3,200 "	888	2	2	2	1½
50	"A"	125.00	3,480 "	3,950 "	1099	2	2½	2	1½
55	"A"	150.00	3,650 "	4,140 "	1150	2	2½	2	1½

NOTE.—The *capacities* of these Inspirators *increase* as steam pressure increases. The special "Regulating Valve" is not applied to the Nos. 10, 12 1/2 and 15 sizes of Type "C" Inspirators.

KORTING'S DOUBLE TUBE INJECTOR.

	Sizes.	Price of Injector.	Capacity in Horse Power.	Gallons per Hour.	Pipe Connections, in.	Iron Strainer.	Brass Dirt Stop.	Drip Funnel.
	00	\$20.00	5 to 8	50	1 1/8	.40	\$1.00	\$.40
	0	21.00	12 to 16	110	1 1/4	.40	1.25	.40
	1	23.00	20 to 30	160	3/8	.40	1.50	.50
	2	28.00	35 to 40	250	1 1/2	.50	2.00	.60
	3	38.00	50 to 65	350	3/4	.60	2.50	.80
	3 1/2	46.00	75 to 90	500	3/4	.60	2.50	.80
	4	55.00	100 to 120	625	1	.75	3.00	.80
	5	60.00	125 to 140	850	1 1/4	1.00	4.00	1.00
	6	65.00	160 to 190	1050	1 1/4	1.00	4.00	1.00
	7	85.00	200 to 240	1400	1 1/2	1.20	5.00	1.20
	8	100.00	260 to 290	1850	1 1/2	1.20	5.00	1.20
	9	120.00	300 to 350	2300	2	1.50	7.00	1.40
	10	135.00	360 to 400	2800	2	1.50	7.00	1.40
	12	165.00	530 to 600	3600	2 1/2	2.40	10.00	2.00

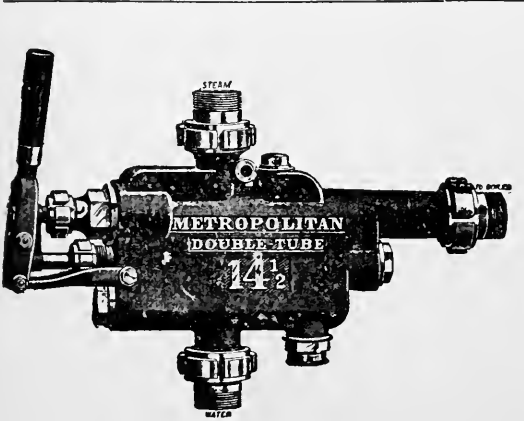
Printed Instructions sent with each Injector.



THE  
METROPOLITAN  
AUTOMATIC INJECTOR.

Sizes.	Prices.	Size of Pipe Connections.			Capacity with Steam Pressure 80 lbs. 2 foot lift.	Horse Power.
		Steam.	Suction.	Delivery.		
2	\$ 15.00	3/8	3/8	3/8	60 Gals.	4 to 6
3	16.00	5/8	3/8	3/8	80 "	6 to 8
3 1/2	18.00	1 1/2	1 1/2	1 1/2	120 "	8 to 15
4	20.00	1 1/2	1 1/2	1 1/2	165 "	15 to 20
5	25.00	3/4	3/4	3/4	250 "	20 to 30
6	30.00	3/4	3/4	3/4	350 "	30 to 45
7	40.00	1	1	1	500 "	45 to 65
8	45.00	1	1	1	600 "	65 to 80
9	55.00	1 1/4	1 1/4	1 1/4	800 "	80 to 100
10	60.00	1 1/4	1 1/4	1 1/4	1,000 "	100 to 130
11	75.00	1 1/2	1 1/2	1 1/2	1,300 "	130 to 170
12	90.00	1 1/2	1 1/2	1 1/2	1,750 "	170 to 230
13	110.00	2	2	2	2,300 "	230 to 300
14	125.00	2	2	2	2,850 "	300 to 375

METROPOLITAN DOUBLE TUBE INJECTOR.

	Sizes.	Prices.	Pipe Connections. Suction. Delivery.	Capacity with 100 lbs. Steam Pressure, 4-foot Lift. Gals.	Horse Power.	Drip Funnel.
	2 1/2	\$18.00	1 1/2	120	8 to 15	\$1 00
	4 1/2	20.00	1 1/2	165	15 to 20	1.00
	5 1/2	25.00	2 1/4	250	20 to 30	1.25
	6 1/2	30.00	3/4	350	30 to 45	1.25
	7 1/2	40.00	1	500	45 to 65	1.50
	8 1/2	45.00	1	600	65 to 80	1.50
	9 1/2	55.00	1 1/4	800	80 to 100	2.00
	10 1/2	60.00	1 1/4	1000	100 to 130	2.00
	11 1/2	75.00	1 1/2	1300	130 to 170	2.50
	12 1/2	90.00	1 1/2	1750	170 to 230	2.50
	13 1/2	110.00	2	2300	230 to 300	3.00
	14 1/2	125.00	2	2850	300 to 375	3.00
	15 1/2	150.00	2 1/2	3500	375 to 500	3.50
	16 1/2	200.00	2 1/2	4200	500 to 650	3.50

DOUBLE OR JACKET STEAM KETTLES.

WITH MOVABLE LEGS.

Tested to 50 lbs. Hydraulic Pressure.

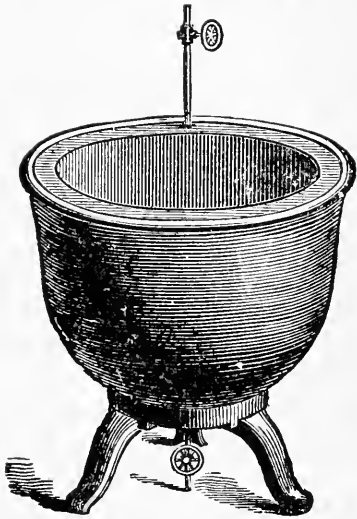
Actual Capacity, gals. ....	5	8	11	18	28	47	76	130	180
Outside Diameter, in. ....	19½	21½	23	26	29½	34½	40	46¼	52¼
Inside Diameter, in. ....	12½	14¼	15½	18¾	23¾	26¾	31¾	38	44¼
“ Depth, in. ....	12	14	15½	17¼	19½	21¾	24½	30¼	30
Extreme Height. . . . .	29	31½	33½	33¾	36½	38	39½	40½	43¾
Price including Legs. ....	20.00	25.00	30.00	38.00	45.00	65.00	90.00	140.00	210.00



DOUBLE OR JACKET STEAM KETTLE.

In this Kettle the inner Caldron is flanged at the top to the body or Kettle proper—the interstitial space forming the Steam Chamber and heating surface.

It is furnished with Copper or Iron Caldrons and with or without covers.



SEAMLESS JACKET STEAM KETTLE

These Kettles are all cast in one piece, having a steam space cored out. They do not require either Bolts or packing in their construction, and are proved at a steam pressure of 75 pounds. Covers of Black or Galvanized Iron and Planished Copper, also larger sized Kettles made to order.

SEAMLESS JACKET STEAM KETTLES.

Capacity in gals. ....	5	10	15	20	25	30	40
Price, without cover. ....	37.50	52.00	60.00	75.00	90.00	105.00	120.00
Half Jacket. ....	---	30.00	45.00	52.00	67.50	82.50	90.00
Covers, Galvanized Iron, Extra. ....	6.00	9.00	12.00	15.00	18.00	21.00	24.00
“ Copper “ ....	10.00	15.00	18.00	21.00	24.00	27.00	30.00

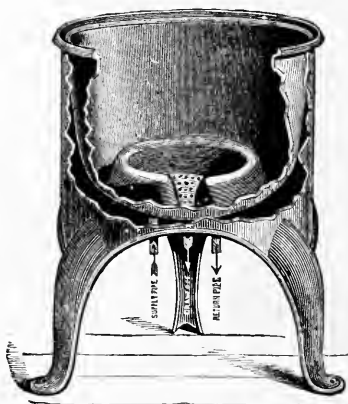
Capacity in gals. ....	50	60	75	80	100	125	150	200
Price, without Cover. ....	135.00	150.00	180.00	210.00	235.00	265.00	330.00	400.00
Half Jacket. ....	100.00	---	---	---	---	---	---	---
Covers, Galvanized Iron, Extra. ....	27.00	30.00	32.00	34.00	36.00	39.00	42.00	45.00
“ Copper “ ....	37.00	45.00	52.50	56.50	60.00	67.50	75.00	82.50

Drilling and tapping for Cocks, extra.      Covers all finished with Brass Trimmings.

PATENTED

## CAST IRON SEAMLESS-JACKET STEAM KETTLES.

NO LEAKING, NO BOILING OVER, NO WASTE  
OF STEAM. POSITIVELY THE BEST  
STEAM KETTLE MADE.



## THIS KETTLE

IS CAST IN ONE PIECE ; LEAKS ARE IMPOSSIBLE.

The location of the steam chamber is the best.

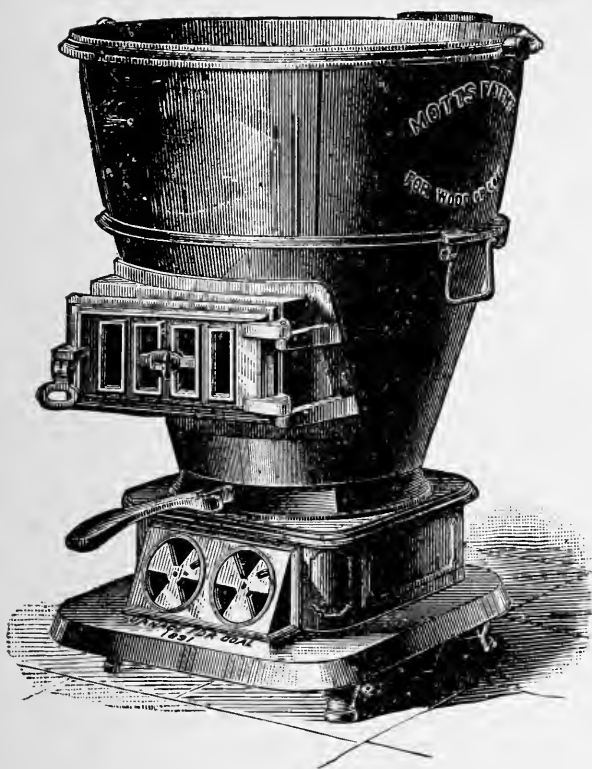
ALL the power of the steam is utilized, whether the kettle is wholly or PARTIALLY filled.

When boiling, the surface of the contents is HIGHEST IN THE CENTRE, instead of highest around the edge, as in other kettles ; this prevents boiling over.

The contents of the kettle do not HARDEN UPON THE SIDES and form a crust there, as in other kettles.

The cast-iron casing which supports the kettle PREVENTS RADIATION of heat.

		Less Cover.	Heavy Galv's Cov. with Brass Hinges and Handles.	Heavy Copper Cov. with Brass Hinges and Handles,	Weight. lbs.
6 Gals.	-	\$15.00	\$ 6.50	\$12.00	90
10 "	-	17.00	7.00	15.00	120
15 "	-	25.00	7.50	18.00	157
20 "	-	30.00	8.50	20.00	205
25 "	-	38.00	10.00	22.00	218
35 "	-	45.00	12.00	25.00	260
45 "	-	50.00	14.00	30.00	394
55 "	-	57.00	16.00	35.00	418
65 "	-	75.00	18.00	45.00	553
80 "	-	87.00	20.00	50.00	681
100 "	-	110.00	25.00	60.00	754
125 "	-	135.00			1344
160 "	-	175.00			1425
200 "	-	200.00			1680



## FURNACE AND CALDRON

FOR HARD OR SOFT COAL.

### FOUR SIZES.

22 Gallons, \$22.00	45 gallons, \$34.00
30 " 27.00	60 " 44.00

The Fire Box is round and lined with fire brick.

The Fire Door is large enough to feed with an ordinary shovel.

Especially adapted to manufacturing, and to numerous industrial purposes.

## PORTABLE FURNACE AND CALDRON.

FOR COAL OR WOOD.

Sizes in Gallons.	Furnace and Caldron for Wood.	Furnace and Caldron for Coal.	Caldrons only.	Cover Extra.
10 Gals.	\$ 10.00	\$ 12.00	\$ 2.50	\$ 1.50
15 "	12.00	14.25	3.50	2.00
22 "	15.00	17.75	4.50	2.50
30 "	20.00	23.50	6.00	2.75
45 "	25.00	29.50	8.00	3.50
60 "	30.00	36.00	10.00	4.50
90 "	45.00	53.00	16.00	6.00
120 "	60.00	72.00	24.00	8.00
140 "	71.00	83.00	35.00	.....
170 "	76.00	88.00	40.00	.....
200 "	86.00	98.00	50.00	.....

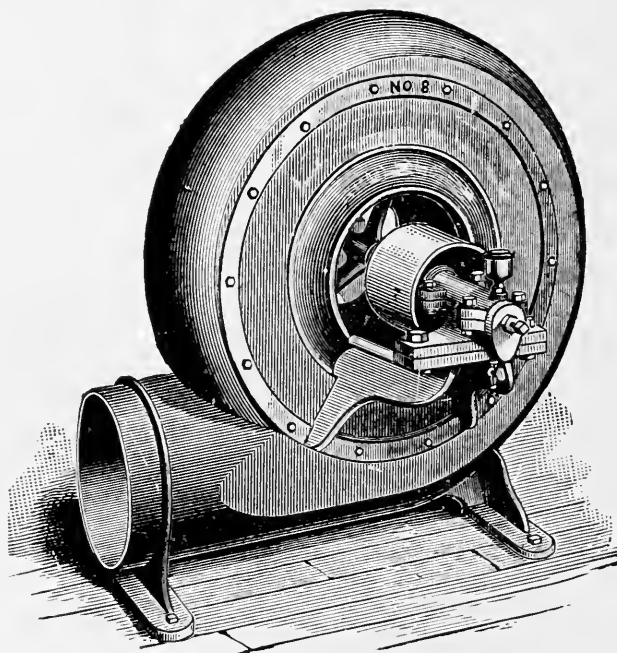


NOTE.—The 140 gallon Caldron has a 4 inch Curb, the 170 gallon an 8 inch Curb, and the 200 gallon a 12 inch Curb. Prices of Copper Caldrons on application.

We can furnish Copper Caldrons for use in above furnaces instead of the Iron Caldrons; also, Copper Caldrons for use inside the Iron Caldrons, *i. e.*, when double Caldrons are wanted. Prices on application.

## BUFFALO BLOWERS AND EXHAUSTERS.

FOR FORGES, FURNACES, VENTILATING, DRYING, AND COOLING



“ B ” PATTERN.

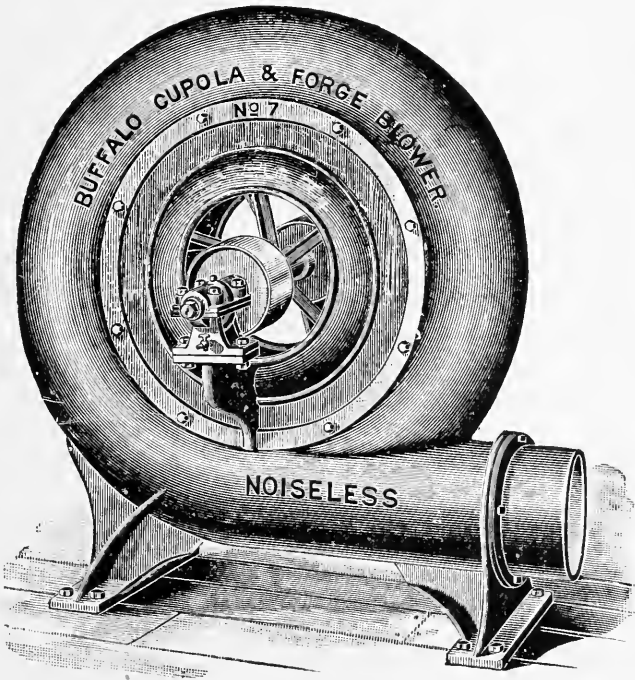
These Fans are built with special reference to durability and smooth running under prolonged and arduous service, having solid shell or case, with a smaller number of parts than any other made, an important point in all high-speed machinery.

No. of Blower or Exhauster.	Height in Inches.	Diameter of Outlet.	Diameter of Inlet.	Diameter of Pulley.	Face of Pulley.	Price.
1 B	15 $\frac{1}{4}$	5	5	2 $\frac{3}{4}$	2 $\frac{1}{4}$	\$20.00
2 B	19 $\frac{1}{4}$	6	6	3 $\frac{1}{4}$	2 $\frac{5}{8}$	25.00
3 B	25	7 $\frac{1}{2}$	7 $\frac{1}{2}$	4	3 $\frac{1}{4}$	33.00
4 B	29	9	9	5	4	44.00
5 B	32	10 $\frac{1}{2}$	10 $\frac{1}{2}$	5 $\frac{3}{4}$	4 $\frac{1}{2}$	55.00
6 B	37 $\frac{1}{2}$	12	12	6 $\frac{1}{2}$	5 $\frac{1}{2}$	70.00
7 B	43	14	14	7 $\frac{1}{2}$	6 $\frac{1}{2}$	90.00
8 B	48	16 $\frac{1}{2}$	16	8 $\frac{1}{2}$	7 $\frac{1}{2}$	150.00
9 B	55	18	18	9 $\frac{1}{2}$	8 $\frac{1}{2}$	200.00
10 B	68	21	21	12	10	250.00
11 B	79	24	24	14	12	350.00



# BUFFALO STEEL PRESSURE BLOWERS.

FOR CUPOLA AND FORGE FIRES, AND OTHER HIGH PRESSURE DUTY.



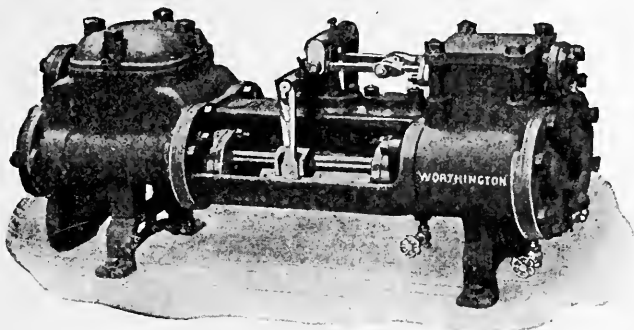
The special features of this Blower are: long, heavy journals in standard ratio of length to diameter of 6 to 1, the solid shell being cast in one piece, and fewer parts than in any other machine; under any service the bearings being in perfect alignment vertically and laterally with the rest of the machine, making it far superior as to durability, smooth running, and economy of power, than any other make.

Number of Blower.	Height in Inches.	Diameter of Outlet.	Diameter of Pulley.	Face of Pulley.	Price without Counter-shaft.	Price with Counter-shaft.	ADJUSTABLE BED.	
							Price with Bed but without Counter-shaft.	Price with Bed and with Counter-shaft.
1	12½	3⅝	2½	1¾	\$12.00	\$20.00	.....	.....
2	15	4	2½	2¼	18.00	28.00	.....	.....
3	20	4⅝	3¼	2⅝	26.00	38.00	.....	.....
4	24	5⅝	4	3	36.00	52.00	.....	.....
5	26	5½	4¼	3	44.00	64.00	.....	.....
6	30	6¼	4½	3½	55.00	80.00	.....	.....
7	35	7¼	5	4½	70.00	100.00	\$100.00	\$135.00
8	40	8⅝	6	4½	90.00	130.00	130.00	175.00
9	45	10	7	5	115.00	170.00	170.00	230.00
10	56	12¼	8	5¾	160.00	230.00	265.00	350.00
11	66	14⅜	9	6¼	225.00	300.00	330.00	435.00
11½	76	16½	10	7	275.00	350.00	380.00	500.00
12	80	18	10	8	325.00	400.00	475.00	625.00

Nos. 1 to 6 Blowers, inclusive, have one pulley, and Nos. 7 to 12 have two pulleys.



WORTHINGTON STEAM PUMPS.



WORTHINGTON BOILER FEED PUMP, PISTON PATTERN, GOOD FOR 150 LBS. PRESSURE.

These pumps are fitted with packed water pistons of iron or brass, as may be required, operating in brass-lined cylinders. The water valves are of brass or hard composition, and are controlled by brass cylindrical springs, held in place by guards of the same material.

Diameter of Steam Cylinders.	Diameter of Water Pistons.	Length of Stroke.	Horse Power of Boiler, based on 30 pounds of water per hour, which the pump will supply with ease.	Diameter of Pistons required in any single cylinder pump to do the same work at same speed.	SIZES OF PIPES FOR SHORT LENGTHS. To be increas- ed as length increases.				List Prices.
					Steam Pipe.	Exhaust Pipe.	Suction Pipe.	Discharge Pipe.	
2	1 <sup>1</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>	35	1 <sup>5</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	1	3 <sup>3</sup> / <sub>4</sub>	90.00
3	1 <sup>3</sup> / <sub>4</sub>	3	100	3	3 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	1	110.00
4 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>4</sub>	4	200	4	1 <sup>1</sup> / <sub>2</sub>	3 <sup>3</sup> / <sub>4</sub>	2	1 <sup>1</sup> / <sub>2</sub>	180.00
5 <sup>1</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>2</sub>	5	400	5	3 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	240.00
6	4	6	550	5 <sup>5</sup> / <sub>8</sub>	1	1 <sup>1</sup> / <sub>4</sub>	3	2	280.00
7 <sup>1</sup> / <sub>2</sub>	5	6	800	7 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	2	4	3	390.00
7 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>2</sub>	10	950	6 <sup>3</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	2	4	3	670.00
9	5 <sup>1</sup> / <sub>4</sub>	10	1300	7 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	2	4	3	770.00
10	6	10	1700	8 <sup>1</sup> / <sub>2</sub>	2	2 <sup>1</sup> / <sub>2</sub>	5	4	950.00

A slight additional charge is made when Pumps are fitted with Brass Plungers and Piston Rods. An extra charge is also made for Bed-plates.

To designate the sizes, give the diameters of Steam Cylinders and Water Plungers, and length of stroke.

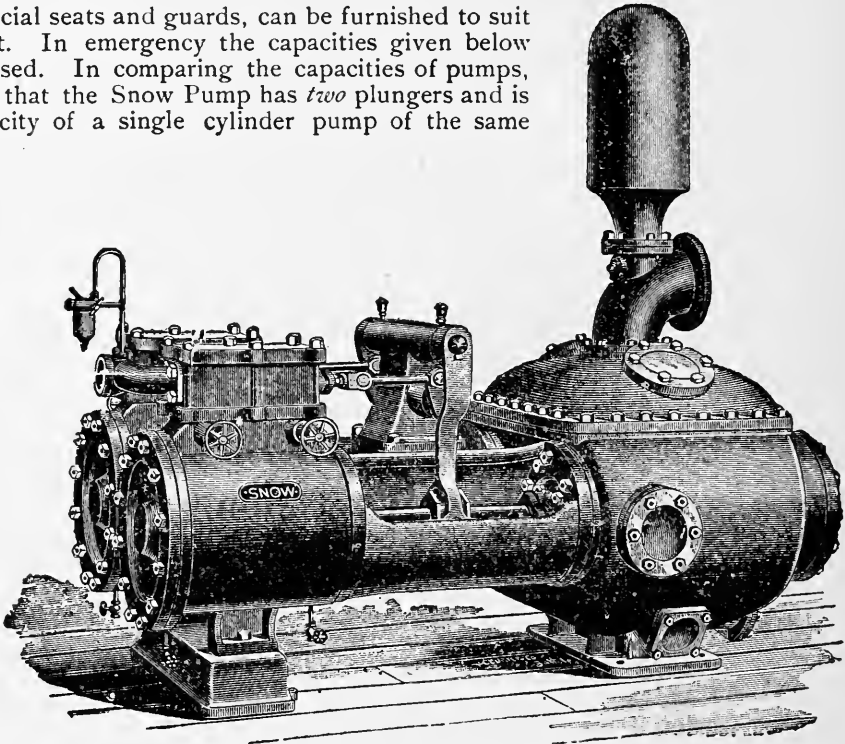
Plunger and Ring Pattern Pumps for General Service, in sizes larger than above, will be quoted on application.

THE SNOW “DUPLEX PLUNGER” PUMP.

FOR GENERAL SERVICE.

The engraving represents the standard design for Duplex Steam Pumps. It is intended for all service when the requirements do not exceed a working pressure of 150 lbs. per square inch. These pumps are fitted with two double-acting plungers, rubber valves, brass seats, guards and springs, suitable for pumping hot or cold water.

Metal valves, with special seats and guards, can be furnished to suit any particular requirement. In emergency the capacities given below may be considerably increased. In comparing the capacities of pumps, it should be borne in mind that the Snow Pump has *two* plungers and is therefore double the capacity of a single cylinder pump of the same dimensions.



Size, 12 x 8½ x 12.

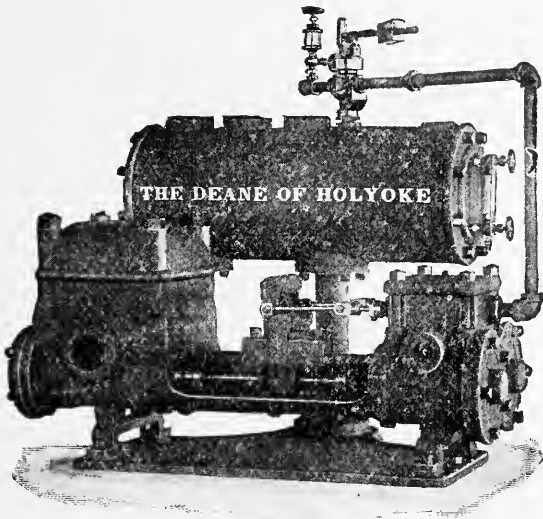
Diameter of Steam Cylinders.	Diameter of Water Plungers.	Length of Stroke.	Displacement in Gallons per stroke of ONE Plunger.	Proper Strokes per minute of ONE Plunger, varying with kind of work and pressure.	Gallons delivered per minute by both Plungers at stated number of Strokes.	Diameter of Plunger required in any single cylinder pump to do same work at same speed.	Diameter of Pipes in Inches.				List Prices.
							Steam.	Exhaust.	Suction.	Discharge.	
2½	1½	2	.015	150 to 300	4½ to 9	2½	¼	½	1	¾	\$ 40.00
3	2	3	.041	100 “ 250	8 “ 20	2⅞	⅜	½	1¼	1	60.00
4½	2¾	4	.10	100 “ 200	20 “ 40	4	½	1	2	1½	95.00
5¼	3½	5	.21	100 “ 200	40 “ 80	5	¾	1¼	2½	2	125.00
6	4	6	.33	100 “ 150	66 “ 100	5⅞	1	1½	3	2	145.00
7	4½	8	.55	100 “ 150	110 “ 165	6⅜	1¼	2	4	3	215.00
8	5	10	.85	75 “ 125	137 “ 212	7⅞	1½	2	5	4	360.00
8	5	10	1.22	75 “ 125	170 “ 305	8½	1½	2	5	4	360.00
10	6	10	1.22	75 “ 125	180 “ 305	8½	2	2½	5	4	420.00
10	7	10	1.66	75 “ 125	250 “ 415	9⅞	2	2½	6	5	525.00
12	7	12	2.00	75 “ 125	300 “ 500	9⅞	2½	3	6	5	640.00
14	7	12	2.00	75 “ 125	300 “ 500	9⅞	2½	3	6	5	680.00
12	8½	12	2.95	75 “ 125	440 “ 740	12	2½	3	8	5	775.00

Sizes are designated by the diameter of the steam cylinders, the diameter of the water plunger, and the length of stroke.

Any number of combinations in addition to the above list can be supplied to meet the requirements of any service.

Bed-plates extra. When pumps are fitted with brass plungers and piston rods, a slight extra charge is made.

# THE DEANE AUTOMATIC DUPLEX FEED PUMP AND RECEIVER.



Size 6—4—6. Pump.

This apparatus is designed to automatically drain heating systems and machines or appliances used in manufacturing which depend upon a free circulation of steam for their efficiency. It furthermore is arranged to automatically pump the water of condensation drained from such systems back to the boilers without loss of heat.

The automatic action of the pump and its speed are controlled by a bucket in receiver which depends upon the principle of specific gravity for its operation. It is connected directly, without the use of intervening levers, cranks and stuffing boxes, to a governor valve in steam supply pipe to pump, thus making the action of the pump conditional upon the rise and fall of the bucket in the Receiver.

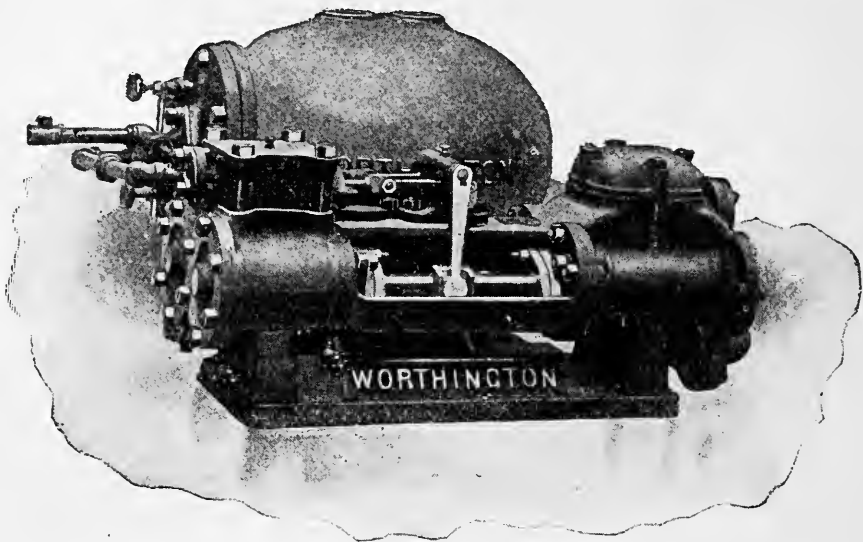
The economy resulting from its use is unquestionable, and the satisfactory and increasing use of this machine leaves no doubt as to its efficiency.

Dia. Steam Cyls.	Dia. Water Cyls.	Length of Stroke.	Square Feet Radiating Surface drained per Minute.*	Dia. Steam Pipe.	Dia. Exh'st Pipe.	Dia. Disch. Pipe.	Dia. Inlet to Receiver.	Price.	Net; Extra for Brass Fitting.
3	2	3	5,000	1 1/2	1 1/2	1	2 1/2	\$150.00	\$2.25
4 1/2	2 3/4	4	10,000	1 1/2	3/4	1 1/2	2 1/2	190.00	5.25
5 1/4	3 1/2	5	20,000	3/4	1 1/4	1 1/2	2 1/2	220.00	7.00
6	4	6	40,000	3/4	1 1/2	2	2 1/2	240.00	9.00
7 1/2	5	6	50,000	1	2	3	2 1/2	345.00	14.00
7 1/2	4 1/2	12	55,000	1	2	3	2 1/2	500.00	25.00
9	5 1/4	12	70,000	1 1/2	2 1/2	3	2 1/2	555.00	35.00
10	6	12	85,000	1 1/2	2 1/2	4	2 1/2	650.00	38.00

\*1,000 square feet radiating surface equal about 3,000 linear feet of one-inch pipe.

WORTHINGTON AUTOMATIC FEED PUMP  
AND RECEIVER.

PATENTED.



The main difficulty met with in any attempt to design a device for automatically controlling the speed of a pump through the level of water in a tank is to secure a reliable form of float. It has been found practically impossible to make a hollow float that will stand water pressure and remain tight ; so that in the place of the air-tight copper balls, formerly used so extensively, various forms of displacement floats depending upon counterbalance weights to make them operative are now employed.

The automatic arrangement illustrated herewith is believed to be freer from all the defects common to this class of apparatus than any heretofore devised. A float of copper is provided with a hole in the top through which the water as it enters the tank is allowed to flow until the float is entirely filled. Its weight, when filled with water, is counterbalanced by an iron weight secured on the opposite end of the beam. As the float is an open one, the pressure of course is equal on the inside and out, so that there is no tendency to collapse. The rising and falling of this float, depending upon the level of the water in the tank, operates a balanced valve which controls the admission of steam to the pump. The stem of this valve passes through a stuffing box located within the tank, any leakage from which is caught by the tank, and is thus unobjectionable. As this stem has no work to perform except to move the balanced valve, it is of small diameter and its stuffing box so insignificant in size that even should the packing tend to stick on the stem, it could not exert friction enough to interfere in any way with the function of the float.

The Worthington Automatic Feed Pump and Receiver is made in four sizes, according to the following list :

No.	Size.	Amount of Radiating Surface it will Drain.	APPROXIMATE DIMENSIONS.			List.
			Length.	Width.	Height.	
I	3 x 2 x 3	5,000 square feet.	3 ft. 1 in.	2 ft. 6 in.	23½ in.	\$300.00
2	4½ x 2¾ x 4	12,500 " "	3 " 3 "	2 " 9½ "	23½ "	380.00
3	5¼ x 3½ x 5	25,000 " "	3 " 9 "	3 " "	23½ "	440.00
4	6 x 4 x 6	40,000 " "	4 " 2 "	3 " ½ "	23½ "	480.00

We can also supply these receivers for use in connection with electric pumps, automatically controlled, if desired.



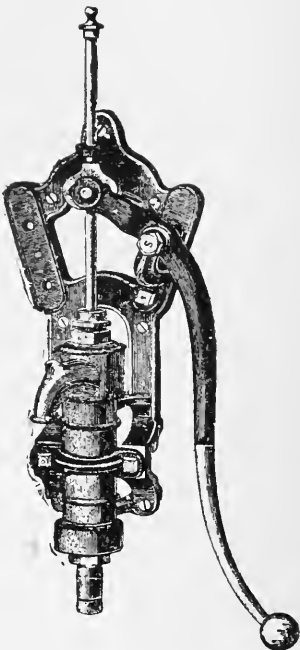
Double Acting Lift and Force Pump.

DOUBLE ACTING LIFT  
AND FORCE PUMP.

Size, inch..... 2½  
Each.....\$30.00

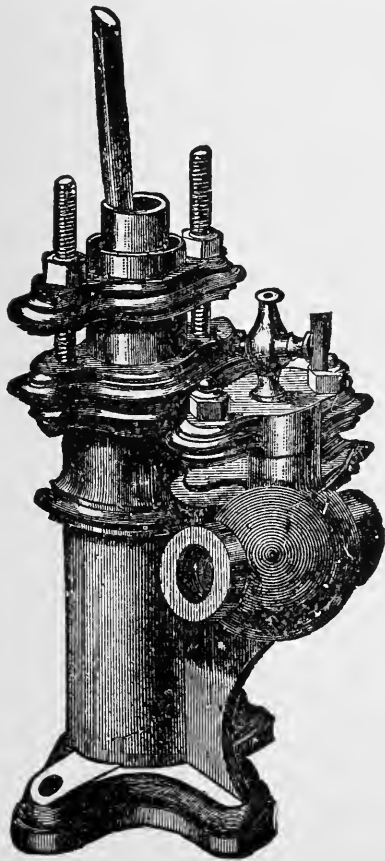
SINGLE ACTING LIFT  
AND FORCE PUMP.

Size, inch ..... 2                      2½  
Each.....\$13.00                      \$16.00



Brass, Single Acting Lift and Force Pump.

NASON'S BOILER FEED PUMP.



The cut represents our Special Pump for boiler feeding, and for raising water when desired, against high pressures.

It is to be driven by a crank, and by placing the driving pin, to which the pump rod is connected, at a greater or lesser distance from the center of the shaft, the quantity per minute can be regulated to a nicety.

The pump is of the plunger pattern, the rod going down into the inside of the plunger, and it is connected at the bottom of it by means of a ball joint, which admits of free motion in all directions, thus reducing any wear on the surface of the plunger to a minimum.

It will be noticed that the gland and stuffing box are made of very liberal size, with a large movement for the follower, so that the pump requires but little attention to the packing; and it will never be found necessary to screw the follower down hard.

STANDARD SIZES, CAPACITIES AND PRICES.

	No. 1	No. 2	No. 3	
Dia. Plunger, in .....	1¼	2¼	3	
Length Stroke, in .....	5	6	8	
Size Pipe Con., in .....	¾	1	1¼	
Greatest No. Strokes per min....	60	50	40	Capacity Based on maximum Speed.
Lbs. Water del. per min.....	13	43	81	
“ “ “ hour.....	780	2590	4860	
*Nom. H. P. of Boiler each will supply.....	26	86	162	
Price.....	11.00	14.00	20.00	

\*Note.—The above Horse Power is calculated on a consumption of 30 lbs. of water for each H. P. developed.



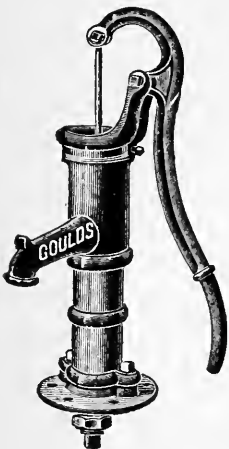


Fig. 199.

CISTERN SUCTION PUMPS.

WITH REVOLVING BEARER TOP AND BOLTED BASE.

Fitted for Wrought Iron or Lead Pipe, or both, as ordered.

No.	Diam. Cyl.	Suction.	Iron.	Brass Cyl.	Brass.
0,	2 in.	1 in.	\$3.50	\$5.50	\$7.75
1,	2¼ "	1 "	4.00	6.00	8.75
2,	2½ "	1¼ "	4.50	7.00	10.50
3,	2¾ "	1¼ "	5.00	8.00	14.00
4,	3 "	1¼ "	5.50	10.00	17.00
5,	3¼ "	1½ "	6.50	13.00	21.00
6,	3½ "	1½ "	8.00	18.00	27.00
8,	4 "	2 "	10.00	25.00	35.00

PITCHER SPOUT SUCTION PUMPS.

WITH CLOSED REVOLVING BEARER TOP  
AND BOLTED BASE.

Fitted for Lead or Wrought Iron Pipe, or both, as ordered.

No.	Diam. Cyl.	Suction.	Iron,	Brass Lined.	Porc. Lined.
1,	2½ in.	1 in.	\$4.25	\$6.50	\$6.50
2,	3 "	1¼ "	4.75	7.25	7.25
3	3½ "	1¼ "	5.25	8.00	8.00
4,	4 "	1½ "	6.25	9.00	9.00
5,	4½ "	1½ "	9.50	12.50	12.50

Nos. 1, 2, 3 furnished with Closed Spout at same list.

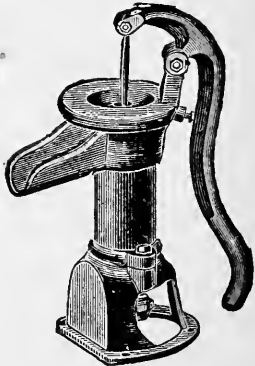


Fig. 205½.



Fig. 550.

ANTI-FREEZING  
WELL LIFT PUMPS.

WITH WROUGHT IRON CONNECTING PIPE  
AND PATENT SAND VALVE.

No.	Diam. Cyl.	Suction.	Capacity per Stroke.	Price.
2,	2½ in.	1¼ in. pipe.	.13 gal.	\$8.00
4,	3 "	1¼ "	.18 "	8.50
6,	3½ "	1½ "	.25 "	9.25

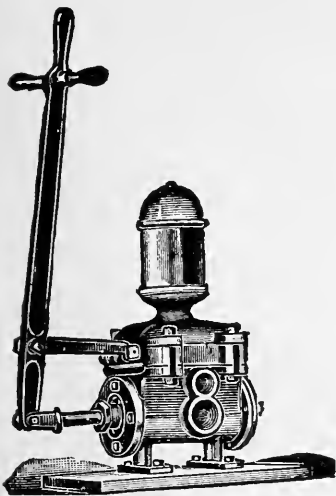


Fig. 747.

“ALERT” DOUBLE ACTING  
FORCE PUMPS.

WITH DOUBLE SUCTION AND DISCHARGE OPENINGS.

No.....	2	4	6	8
Diam. Cylinder, inches,	2½	3	3½	4
Suction Pipe, inches,..	1¼	1¼	1½	1½
Discharge Pipe, inches,	1	1	1¼	1¼
Iron,.....	\$16.00	18.00	20.00	24.00
Brass Lined,.....	17.50	20.00	22.50	27.00

HYDRAULIC RAMS.

Fig. 345½.

Size, No.....	2	3	4	5	6	7	8
Pipes, Drive, inches,	¾	1	1¼	2	2½	3	4
“ Dis. inches,..	½	½	¾	1	1¼	1½	2
With Leather Valve, \$	9.00	11.00	14.00	22.00	40.00	75.00	125.00

Leather Valve under Air Chamber.

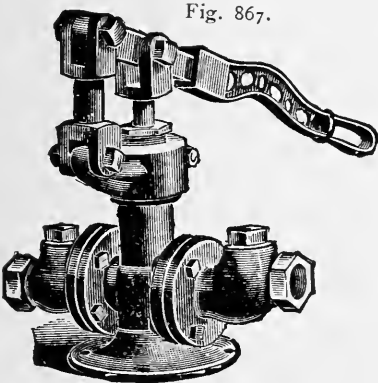
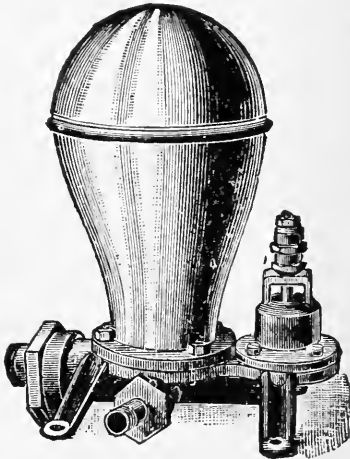


Fig. 867.

HYDRAULIC PRESSURE OR  
TEST PUMPS.

WITH REVOLVING TOP.

No.....	0	1	2	3
Diameter Ram. inch,..	¾	1	1¼	1½
Suc. and Dis. Pipe, ins.	1	1	1	1
Working Pressure, lbs.	700	550	400	200
Price,.....	\$20.00	21.50	22.50	27.50

BOILER FEED PUMP.

Fig. 484 represents improved pattern of Power Boiler Feed Pump with crank shaft, face plate, tight and loose pulleys, for manual or machine power. On the end of driving shaft opposite the face plate is a heavy iron crank with wrought-iron handle for working Pump when necessary.

No.....	0	2	4
Diameter of Cylinder, inches.....	2	2½	3
Stroke, inches.....	3½	3½	3½
Capacity per Min., 60 Strokes, gals.....	2.45	3.82	5.51
Suction Pipe, inches.....	1	1	1¼
Discharge Pipe, inches.....	1	1	1¼
* Lift and Force, feet.....	120	90	60
Equivalent Pressure, lbs.....	60	45	30
Pulley, inches.....	16x3	16x3	16x3
Price.....	\$34.00	40.00	50.00

\* Total lift and force from supply to point of delivery. Pump not more than 25 feet above water. Hot water must flow to Pump.

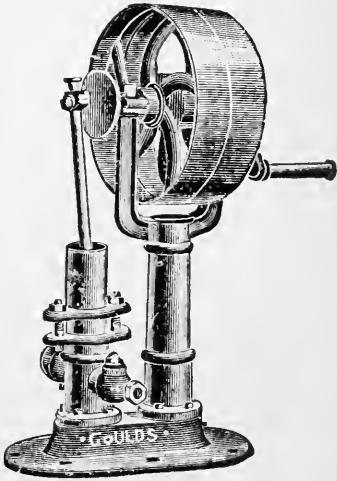


Fig 484.

DOUBLE ACTING  
WELL FORCE PUMPS.

FOR SHALLOW OR DEEP WELLS—OPEN, DRIVEN,  
DRILLED OR CASED.

No.	Diam. Lower Cyl.	Suction.	Capacity per Stroke.	Brass Lined Cyl.	Brass Body Cyl.
2,	2½ in.	1¼ in. pipe.	.13 gal.	\$14.00	\$15.00
4,	3 “	1¼ “	.18 “	14.50	15.50

Universal bushing, adapting pumps for shallow or deep wells, strainer and hose connection are supplied with each pump, and included in price.

WELL FORCE PUMP  
STANDARDS.

WITH REVOLVING TOP.

FOR MANUAL OR WIND POWER.

Stroke.	Suction.	No. 1.	No. 2.
6 in.	1¼ in. pipe.	\$10.00	\$11.00
10 “	2 “	11.50	12.50

ANTI-FREEZING  
WELL FORCE PUMP HEADS.

WITH PATENT VERTICAL SHIFTING VALVE AND SCREW  
HANDLE.—FOR MANUAL OR WIND POWER.

Stroke.	Suction.	Lower Dis.	Price.
6 in.	1¼ in. pipe.	1 in. pipe.	\$18.00
10 “	2 “	1 “	19.50
Adjustable, } 6, 8 or 10 in. }	2 “	1 “	20.50

Cylinders, page 319, are required with this standard, and cost extra.

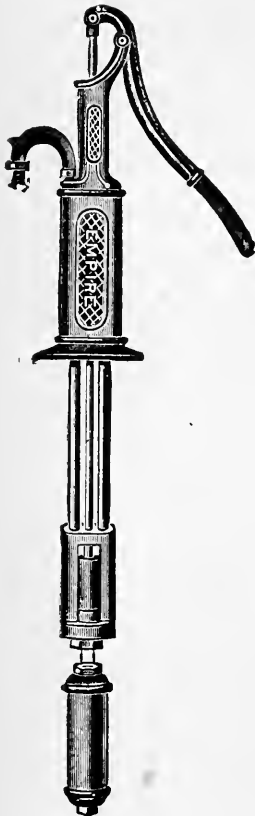


Fig. 1025.

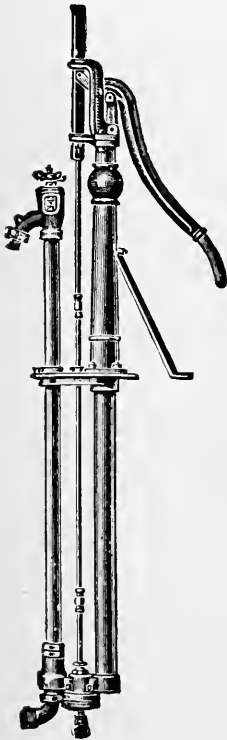


Fig. 1033.

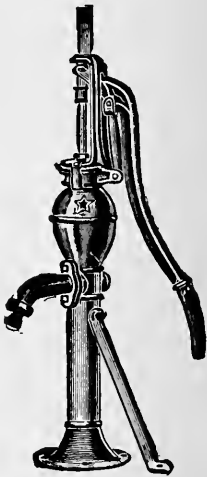


Fig. 422.

PUMP CYLINDERS, OR WORKING BARRELS.

Screw Attach.

Bolt Attach.



Fig. 609.

FIGS. 609 AND 610, GAS SET PUMP CYLINDERS.

Size.	Stroke.	Fitted for	Iron.	Brass Lined.	All Brass.
2 1/4 x 10	6 inch.	1 inch.	\$4.00	\$7.75	\$11.00
2 1/2 x 10	6 "	1 1/4 "	4.35	8.00	12.25
2 3/4 x 10	6 "	1 1/4 "	4.70	8.50	12.75
3 x 10	6 "	1 1/4 "	5.00	9.00	13.50
3 1/2 x 10	6 "	1 1/2 "	7.00	10.50	16.75
4 x 10	6 "	2 "	9.00	13.00	21.50

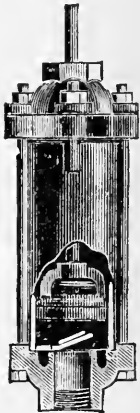


Fig. 610.

FIG. 611, SHALLOW WELL PUMP CYLINDERS.

Size.	Stroke.	Fitted for	Iron.	Brass Lined.	All Brass.
2 x 12	8 inch.	1 inch.	\$5.50	\$3.00	\$11.25
2 1/4 x 12	8 "	1 "	5.75	8.25	11.50
2 1/2 x 12	8 "	1 1/4 "	6.00	8.50	12.75
2 3/4 x 12	8 "	1 1/4 "	6.50	9.00	13.25
3 x 12	8 "	1 1/4 "	7.00	9.50	14.00
3 1/4 x 12	8 "	1 1/4 "	8.00	10.25	15.25
3 1/2 x 12	8 "	1 1/2 "	9.00	11.25	17.50
4 x 12	8 "	2 "	11.50	14.25	22.50



Fig. 611.

FIG. 613, DEEP WELL PUMP CYLINDERS.

Size.	Stroke.	Fitted for	Iron.	Brass Lined.	All Brass.
2 x 16	10 inch.	1 inch.	\$6.00	\$9.00	-----
2 1/4 x 16	10 "	1 "	6.50	9.75	-----
2 1/2 x 16	10 "	1 1/4 "	7.00	10.25	-----
2 3/4 x 16	10 "	1 1/4 "	7.50	10.75	-----
3 x 16	10 "	1 1/4 "	8.00	11.25	-----
3 1/2 x 16	10 "	1 1/2 "	11.25	13.50	-----
4 x 16	8 "	2 "	14.50	17.50	-----

FIG. 616, BRASS SEAMLESS TUBE CYLINDERS.

Size.	Brass Body and Plunger.	All Brass.	Size.	Brass Body and Plunger.	All Brass.
2 x 10 1/2	\$8.00	\$10.75	2 x 16	\$10.50	\$13.75
2 1/4 x 10 1/2	8.25	11.00	2 1/4 x 16	11.25	14.50
2 1/2 x 10 1/2	8.50	12.25	2 1/2 x 16	11.75	16.00
2 3/4 x 10 1/2	9.00	12.75	2 3/4 x 16	12.25	16.50
3 x 10 1/2	9.75	13.50	3 x 16	12.75	17.25
3 1/2 x 10 1/2	11.50	16.75	3 1/2 x 16	16.00	22.25
4 x 10 1/2	15.50	21.50	4 x 16	20.50	28.00



Fig. 613.



Fig. 616.

Fig. 616 in 10 1/2 inch length has 7 inch stroke.

Fig. 616 in 16 inch length has 9 inch stroke.

Fitted for same size pipe connections as other Figs. shown.



BRASS JACKET POINTS.

MADE OF GALVANIZED WROUGHT IRON PIPE.

Trade Number.	Size in Diameter	Length of Point, Inches.	Length of Jacket, Inches.	No. of Holes.	Number of Gauze 60, Price per Dozen.	Number of Gauze 70, Price per Dozen.	Number of Gauze 80, Price per Dozen.	Number of Gauze 90, Price per Dozen.	Number of Gauze 100, Price per Dozen.
74	1	24	18	72	\$33.00	\$40.00	\$46.00	\$52.00	\$62.00
76	1	30	24	96	42.00	49.00	56.00	64.00	78.00
78	1	36	30	120	51.00	59.00	66.00	76.00	94.00
80	1	42	36	144	60.00	68.00	76.00	88.00	120.00
82	1	48	42	168	69.00	78.00	86.00	100.00	136.00
84	1	54	48	197	78.00	87.00	96.00	112.00	152.00
86	1 1/4	20	14	80	30.00	36.00	42.00	50.00	64.00
90	1 1/4	24	18	100	36.00	44.00	52.00	60.00	80.00
94	1 1/4	30	24	130	46.00	55.00	64.00	75.00	100.00
98	1 1/4	36	30	165	56.00	66.00	76.00	90.00	120.00
100	1 1/4	42	36	200	66.00	77.00	88.00	105.00	140.00
102	1 1/4	48	42	270	76.00	88.00	100.00	120.00	160.00
106	1 1/4	54	48	260	86.00	99.00	112.00	135.00	180.00
110	1 1/4	60	54	290	96.00	110.00	124.00	150.00	200.00
112	1 1/4	66	60	320	106.00	121.00	136.00	165.00	220.00
114	1 1/4	72	66	350	116.00	132.00	148.00	180.00	240.00
136	1 1/2	24	18	120	48.00	57.00	65.00	78.00	94.00
140	1 1/2	30	24	162	60.00	70.00	80.00	96.00	118.00
144	1 1/2	36	30	198	72.00	84.00	95.00	114.00	142.00
146	1 1/2	42	36	240	84.00	97.00	110.00	132.00	166.00
148	1 1/2	48	42	276	96.00	111.00	125.00	150.00	188.00
150	1 1/2	54	48	312	108.00	124.00	140.00	168.00	204.00
152	1 1/2	60	54	348	120.00	138.00	155.00	186.00	228.00
154	1 1/2	66	60	384	132.00	151.00	170.00	204.00	252.00
156	1 1/2	72	66	420	144.00	165.00	185.00	222.00	276.00
160	2	24	18	144	75.00	85.00	94.00	110.00	130.00
164	2	30	24	208	90.00	101.00	112.00	132.00	160.00
168	2	36	30	264	105.00	118.00	130.00	154.00	190.00
170	2	42	36	288	120.00	134.00	148.00	176.00	220.00
172	2	48	42	336	135.00	151.00	166.00	198.00	250.00
174	2	54	48	384	150.00	167.00	184.00	220.00	280.00
176	2	60	54	432	165.00	184.00	202.00	242.00	310.00
178	2	66	60	480	180.00	200.00	220.00	264.00	340.00
180	2	72	66	528	195.00	217.00	238.00	286.00	370.00
184	2 1/2	36	30	300	180.00	205.00	230.00	260.00	300.00
188	2 1/2	48	42	360	230.00	265.00	300.00	340.00	400.00
192	2 1/2	60	54	420	280.00	325.00	370.00	420.00	500.00
196	2 1/2	72	66	480	330.00	385.00	440.00	500.00	600.00
200	3	36	30	300	240.00	275.00	310.00	340.00	410.00
204	3	48	42	420	300.00	345.00	390.00	430.00	520.00
208	3	60	54	540	360.00	415.00	470.00	520.00	630.00
212	3	72	66	660	420.00	485.00	550.00	610.00	740.00
216	4	48	36	360	480.00	520.00	560.00	600.00	700.00
220	4	72	60	600	630.00	695.00	760.00	840.00	1000.00
224	4	96	84	840	780.00	870.00	960.00	1080.00	1300.00
228	4	120	108	1080	930.00	1045.00	1160.00	1320.00	1600.00

PATENT DRIVE WELL COUPLINGS.

Size...	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	9	10
Price..	.10	.12	.15	.25	.30	.40	.60	.80	1.30	1.50	2.00	2.40	2.80	3.85	4.00	5.00	6.00



DRIVE CAPS.

Size.....	1 1/4	1 1/2	2
Price.....	.75	1.00	1.60

# FOOT VALVES AND STRAINERS.

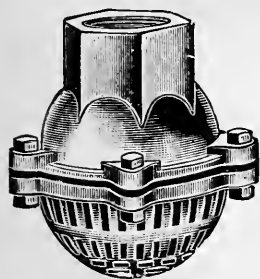


Fig. 760.  
Screwed Foot Valve.

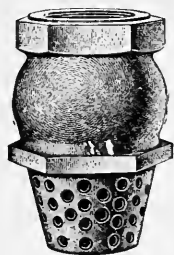


Fig. 209.  
Screwed Foot Valve.

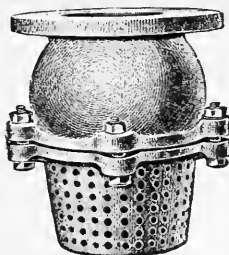


Fig. 211.  
Flange Foot Valve.

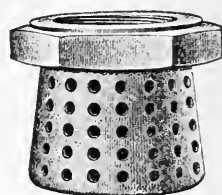
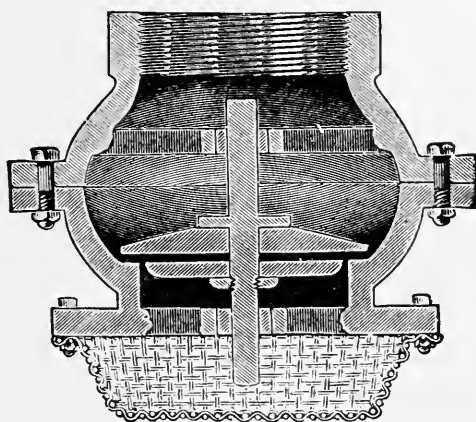


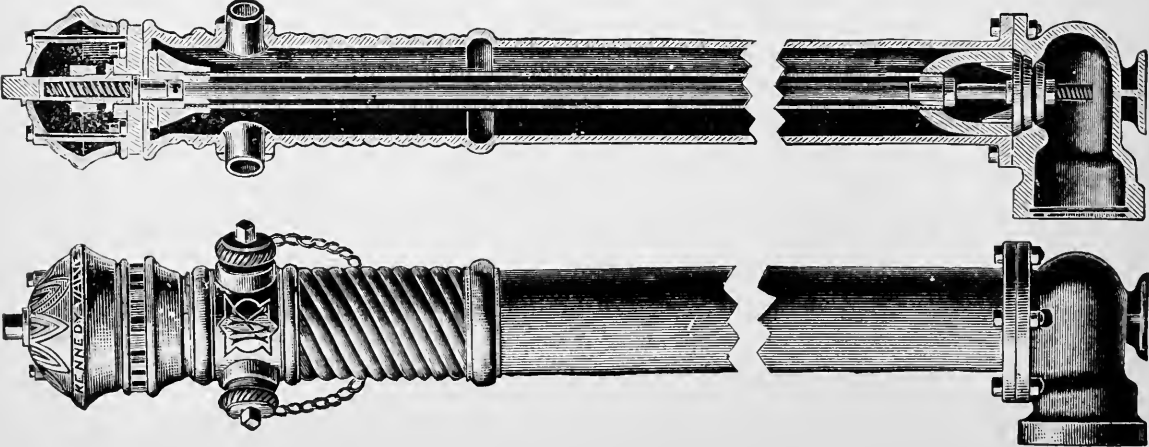
Fig. 212.  
Cast Iron Strainer.

Sizes	¾	1	1¼	1½	2	2½	3	3½	4
Fig. 760, Black	.42	.42	.48	.62	.82	1.20	1.70	2.50	2.75
Fig. 760, Galv'd	.60	.60	.75	1.00	1.45	2.00	2.70	3.90	4.25
Fig. 209, Black	1.15	1.30	1.40	1.90	2.40	3.30	3.90	5.60	7.30
Fig. 209, Galv'd	1.75	1.95	2.10	2.85	3.60	4.95	5.85	8.40	10.95
Fig. 211, Black	---	---	---	---	3.50	4.50	5.75	7.50	9.50
Fig. 211, Galv'd	---	---	---	---	5.25	6.75	8.65	11.25	14.25
Fig. 212, Black	.22	.25	.33	.44	.55	.82	1.10	1.75	2.00
Fig. 212, Galv'd	.30	.34	.43	.58	.80	1.20	1.70	2.60	3.00
Sizes	4½	5	6	7	8	10	12	14	16
Fig. 760, Black	---	4.25	7.00	---	16.00	---	---	---	---
Fig. 760, Galv'd	---	6.50	10.00	---	30.00	---	---	---	---
Fig. 209, Black	10.50	11.25	14.75	35.00	41.00	64.00	100.00	---	---
Fig. 209, Galv'd	15.75	16.90	22.15	52.50	61.50	96.00	150.00	---	---
Fig. 211, Black	13.00	14.00	17.50	38.00	45.00	70.00	112.00	150.00	200.00
Fig. 211, Galv'd	19.50	21.00	26.25	57.00	67.50	105.00	168.00	225.00	300.00
Fig. 212, Black	---	2.50	3.50	---	7.50	---	---	---	---
Fig. 212, Galv'd	---	3.90	5.00	---	11.00	---	---	---	---

IRON BODY, BRONZE MOUNTED VERTICAL FOOT VALVE,  
WITH RUBBER FACED GATES AND COPPER SCREEN.



Sizes—	inches	2	2½	3	4	5		
Screwed Ends		11.50	12.00	16.25	20.00	26.25		
Flanged Ends		11.75	12.25	16.25	20.00	25.75		
Hub or Bell Ends								
If without Screen, deduct from list					4.50	5.25		
Sizes—	inches	6	7	8	10	12		
Screwed Ends		33.00	38.50	44.75	82.00	113.00		
Flanged Ends		32.50	38.00	43.50	82.00	112.00		
Hub or Bell Ends		33.25	39.00	46.50	83.00	113.00		
If without Screen, deduct from list		6.25	7.00	8.00	7.00	70.00		
Sizes—	inches	14	16	18	20	24	30	36
Flanged Ends		145.00	190.00	235.00	265.00	400.00	780.00	1,320.00
Hub or Bell Ends		147.00	193.00	238.00	268.00	405.00	790.00	
If without Screen, deduct from list		12.50	15.00	21.00	24.50	31.00	50.00	



KENNEDY FIRE HYDRANTS.  
COMPOSITION MOUNTED. HIGH PRESSURE.

Always state : Size and shape of Nut to open Hydrant. The Number of Nozzles. With or without Frost Cases. Length from Pavement to bottom of Hydrant. Size of connection. Whether Hub, Screwed, Flanged or Spigot connection. Inside Diameter of Stand Pipe. Turn to Right or Left to Open. Standard turns to the Right. Send gauge for the thread on Nozzles.

Diameter of Pipe Connection.	Diameter of Stand Pipe.	Valve Opening.	Number and Size of Nozzles.	Length from Pavement to Bottom of Connection, length from 5 ft.		Each 2½-inch Nozzle Additional.	Each 2½-inch Steam Nozzle Additional.	Frost Case Additional.	Add for Secondary Stop Valve.
				LIST	Deduct for each 6 ins. difference in length from 5 ft. LIST				
3 or 4 ins	5 in.	3 in.	One 2½-in.,	\$28.00	\$1.00	\$2.00	\$3.50	\$4.50	\$5.75
4 or 6 "	6 "	4 "	Two 2½-in.,	33.00	1.00	2.00	3.50	5.00	7.50
4 or 6 "	6 "	4 "	One Steamer or two 2½-in.,	33.00	1.00	2.00	3.50	5.00	7.50
4 or 6 "	7 "	5 "	One Steamer or two 2½-in.,	36.00	1.25	2.00	3.50	6.00	9.00
4 or 6 "	7 "	5 "	One Steamer and one 2½-in.,	38.00	1.25	2.00	3.50	6.00	9.00
6 "	9 "	6 "	One Steamer and two 2½-in.,	51.35	1.75	2.00	3.50	9.00	11.00

EXTENSION VALVE BOXES.

Size of Valve.....	3 in.	4 in.	6 in.	8 in.	10 in.	12 in.	14 in.	16 in.
1 ft. 10 in. to 2 ft. 4 in.....	\$3.25	\$3.25	\$3.50	\$3.50	\$3.50	\$3.50	\$4.00	\$4.00
2 ft. 4 in. to 3 ft. 2 in.....	3.40	3.40	3.65	3.65	3.65	3.65	4.15	4.15
3 ft. to 4 ft.....	3.55	3.55	3.80	3.80	3.80	3.80	4.30	4.30
3 ft. 6 in. to 4 ft. 6 in.....	3.75	3.75	4.00	4.00	4.00	4.00	4.50	4.50
4 ft. to 5 ft.....	4.00	4.00	4.25	4.25	4.25	4.25	4.75	4.75
3 ft. 6 in. to 5 ft. 6 in.....	4.20	4.20	4.45	4.45	4.45	4.45	4.95	4.95
4 ft. to 6 ft.....	4.50	4.50	4.75	4.75	4.75	4.75	5.25	5.25
5 ft. to 6 ft.....	4.65	4.65	4.90	4.90	4.90	4.90	5.40	5.40
5 ft. to 7 ft.....	4.80	4.80	5.05	5.05	5.05	5.05	5.55	5.55
6 ft. to 7 ft.....	5.00	5.00	5.25	5.25	5.25	5.25	5.75	5.75
6 ft. to 8 ft.....	5.20	5.20	5.45	5.45	5.45	5.45	5.95	5.95

N. B.—When ordering Boxes please specify length required, also size of Valve.



## THE "LEWIS" PATENT SELF-CLOSING HYDRANTS.

Fig. 667.

WITH STOP VALVE FOR LEAD PIPE.

Can also be connected to Iron Pipe by taking off Coupling.

---

In Ground....feet	2,	2½,	3,	3½,	4,	4½,	5,	6,
¾ in. Hose..each	10.00	10.75	11.00	11.75	12.00	12.75	13.00	14.00

---

Fig. 668.

WITH STOP VALVE.

SCREWED FOR ¾ IN. IRON PIPE.

---

In Ground....feet	2,	2½,	3,	3½,	4,	4½,	5,	6,
¾ in. Hose..each	10.00	10.75	11.00	11.75	12.00	12.75	13.00	14.00

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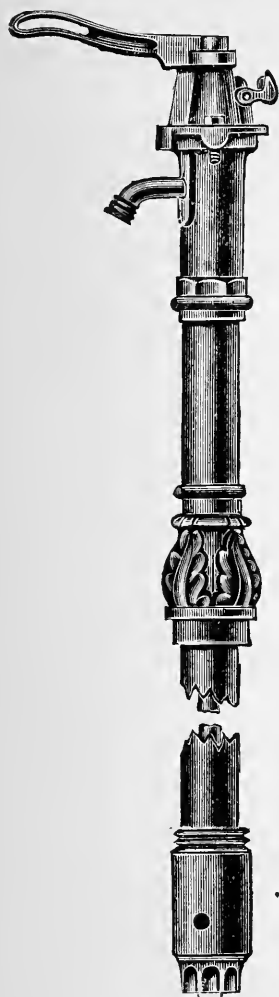


Fig. 668.

## THE "LEWIS" PATENT COMPRESSION HYDRANTS.

Fig. 665.

WITH STOP VALVE FOR LEAD PIPE.

Can also be connected to Iron Pipe by taking off Coupling.

---

In Ground..feet	2,	2½,	3,	3½,	4,	4½,	5,	6,
¾ in. Hose, each	9.00	9.75	10.00	10.75	11.00	11.75	12.00	13.00

---

Fig. 666.

WITH STOP VALVE.

SCREWED FOR ¾ IN. IRON PIPE.

---

In Ground..feet	2,	2½,	3,	3½,	4,	4½,	5,	6,
¾ in. Hose, each	9.00	9.75	10.00	10.75	11.00	11.75	12.00	13.00
I    "        "	11.50	12.25	12.50	13.25	13.50	14.25	14.50	15.50

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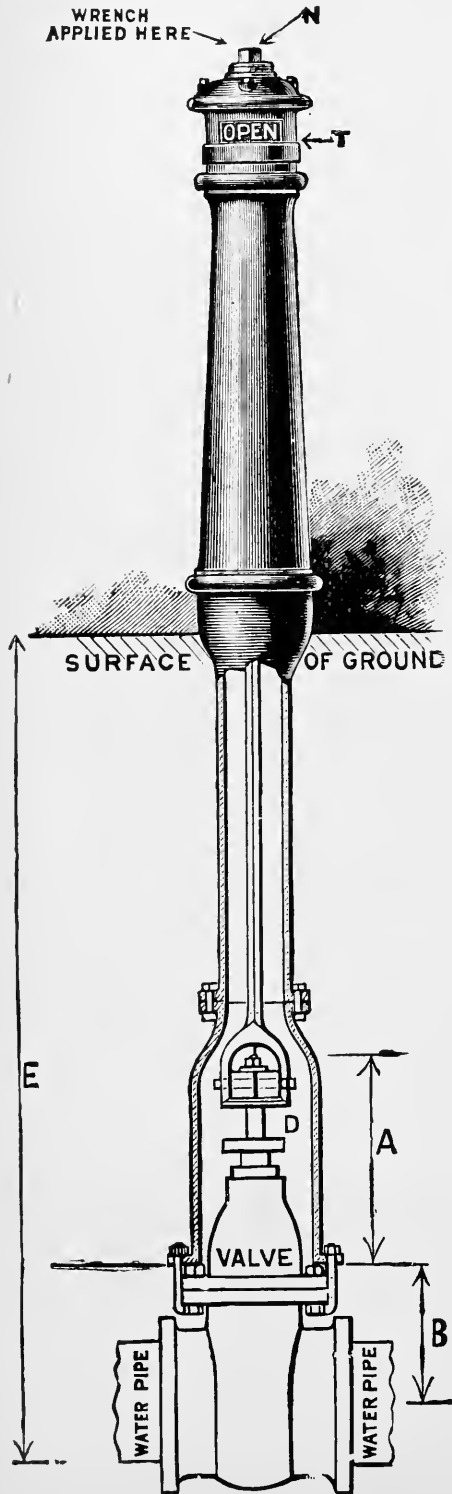
Fig. 666.

### VALVE INDICATOR POST.

This Indicator Post is designed expressly for water valves connected with street mains, and for use with valves for fire service in mill and factory yards.

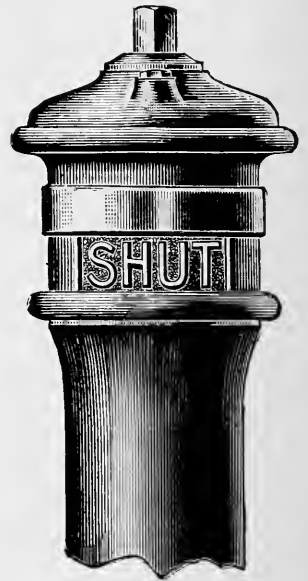
This Indicator shows plainly at a glance whether valve is open or closed.

Serious fire damage has often occurred by reason of valve being closed and water accidentally shut off from automatic sprinklers, and continuing shut off unknown to the superintendent or others in charge.



By using the Indicator Post you do away with the annoyance and delay of searching for a flush gate box sometimes hidden under snow or dirt, and the delay of opening a frozen gate-box cover.

Turning the nut N opens and closes the valve, thereby raising or lowering the brass band T, which is carried around post. This band covers and uncovers the words OPEN or SHUT on both sides, and will positively indicate whether valve is whole or partly open or closed.



The moving parts and letters are made of brass, therefore will not rust or be easily broken.

Having no parts exposed that can be injured, it can be used in any public street or yard, and cannot be manipulated without the aid of a key, which can be kept at a convenient place.

This Indicator Post can be supplied separate, and can be used on any other make of valve.

In ordering, fill in dimensions as indicated by arrows at letters A, B, E, or SEND A VALVE, WHICH IS PREFERABLE.

Always state number of turns to open Valve, and whether valve opens by turning to the LEFT or RIGHT.

LIST PRICE - \$36.00.

STOP COCK BOXES AND STREET WASHERS.

SERVICE BOX.



Service Box.

92d.	2 ft. to 3 ft. 6	-----	\$1.35
93d.	3 " 4 "	-----	1.40

"STAR" STREET WASHER.

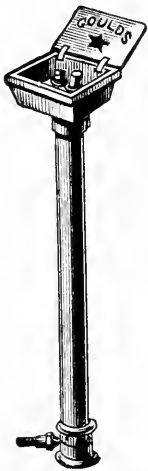


Fig. 647.

Set in Ground.	$\frac{3}{4}$ in.	1 in.
18 in	\$7.75	\$9.25
24 "	8.00	9.50
30 "	8.25	9.75
36 "	8.50	10.00
42 "	9.00	10.50
48 "	9.50	11.00
54 "	10.00	11.50
60 "	10.50	12.00
72 "	11.50	13.00

STOP COCK BOX.



Stop Cock, each	-----	\$1.20
-----------------	-------	--------

STREET WASHER ROD.



Each	-----	\$ .50
Hydrant Rod, each	-----	.75

YARD HYDRANTS.



Fig. 646.  
"Star" Compression Hydrant.

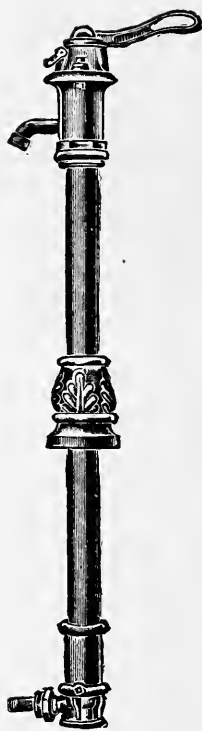


Fig. 1116.  
"No Shock" Self-Closing Hydrant.

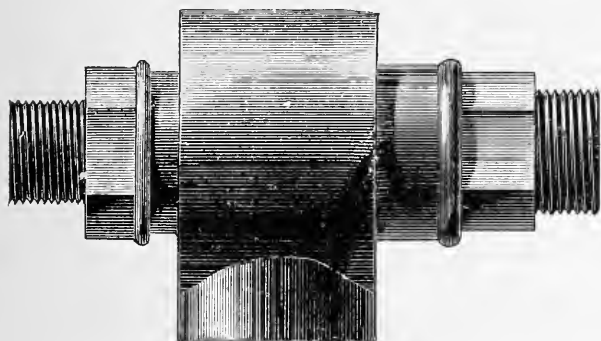
FIG. 646.

Set in Ground.	Service Pipe,	$\frac{3}{4}$ in.	1 in.
18 in.	" "	9.25	11.75
24 "	" "	9.50	12.00
30 "	" "	9.75	12.25
36 "	" "	10.00	12.50
42 "	" "	10.50	13.00
48 "	" "	11.00	13.50
54 "	" "	11.50	14.00
60 "	" "	12.00	14.50
72 "	" "	13.00	15.50

FIG. 1116.

Set in Ground.	Service Pipe, $\frac{3}{4}$ in.	
24 in.	" " "	\$10.50
30 "	" " "	10.75
36 "	" " "	11.00
42 "	" " "	11.50
48 "	" " "	12.00
54 "	" " "	12.50
60 "	" " "	13.00
72 "	" " "	14.00

## NASON'S EJECTORS OR SYPHON PUMPS FOR RAISING WATER AND CONVEYING LIQUIDS.



Size Nos. ....	1	2
Size of Steam Connections	$\frac{3}{4}$ in.	1 in.
" Suction .....	$1\frac{1}{4}$ "	$1\frac{1}{2}$ "
" Discharge .....	1 "	$1\frac{1}{4}$ "
Price, Iron .....	\$3.00	\$5.00
" Brass .....	3.00	5.00

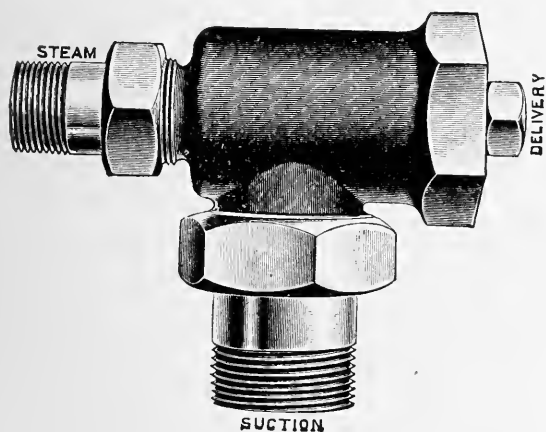
Like all Ejectors they are better adapted to service where the volume of water to be lifted is large, against a small elevation. For such service, and where the water is cold, they will be found to be fairly economical, and have the advantage over pumps for similar service, in having no valves or cramped passages likely to be obstructed or clogged by mud, gravel or other material likely to clog a pump.

The best results are given where the lift is low—not exceeding 15 to 20 feet, unless the steam pressure is very high, say above 70 lbs. The water may be lifted by them to a much greater height, but at the sacrifice of economy.

Among the numerous classes of work to which they are applicable may be mentioned that of raising water and other fluids from Tanks, Wells, Mines, Quarries, Holds of Vessels, Docks, Gas Works, etc.

NOTE.—Where economy in the use of steam is important these Ejectors are not recommended to lift over a height of fifteen feet.

## THE HANCOCK "EJECTOR" OR JET PUMP.



Size.	Capacity Per Hour.	Pipe Connections.		Price.
		Steam.	Suction and Delivery.	
No. 1 Brass	244 Gals.	$\frac{1}{4}$ inch	$\frac{1}{2}$ inch	\$8 00
" 2 "	550 "	$\frac{3}{8}$ "	$\frac{3}{4}$ "	10 00
" 3 "	977 "	$\frac{1}{2}$ "	1 "	15 00
" 4 "	1,525 "	$\frac{3}{4}$ "	$1\frac{1}{4}$ "	20 00
" 5 Iron	2,200 "	$\frac{3}{4}$ "	$1\frac{1}{2}$ "	25 00
" 6 "	3,900 "	1 "	2 "	35 00
" 7 "	6,000 "	$1\frac{1}{4}$ "	$2\frac{1}{2}$ "	37 50
" 8 "	8,800 "	$1\frac{1}{2}$ "	3 "	40 00
" 9 "	15,600 "	2 "	4 "	65 00
" 10 "	24,300 "	$2\frac{1}{2}$ "	5 "	90 00
" 11 "	35,000 "	$2\frac{1}{2}$ "	6 "	125 00

Sizes 1, 2, 3 and 4 are made entirely of brass.

Sizes 5, 6 and 7 have iron bodies and brass unions for steam and suction.

Sizes 8, 9, 10 and 11 have iron bodies with brass unions for steam only.

Sizes 5, 6, 7, 8, 9, 10 and 11 made entirely of brass—larger sizes, and Ejectors for handling corrosive liquids furnished on special order.

The "Hancock" Ejector is designed for use at Railroad Water Stations, on construction trains, for emptying wheel-pits and similar railroad service; also for transporting liquids, either hot or cold, in tanneries, dye houses, etc.

It is simple in construction, compact in form, convenient to handle, has *no movable parts*, and cannot get out of order, and is far more economical in the use of steam than any other similar apparatus.

All sizes will lift water 25 feet and elevate it about 15 feet above the Ejector with a steam pressure of 60 lbs.

If it is desired to elevate liquids a greater distance than 40 feet, the Ejector should be placed near the liquid so that it can be forced by the Ejector. In this manner liquids can be lifted about 50 feet with 75 pounds pressure and about 70 feet with 100 pounds pressure.

There must be *no leak* in the suction connections.

Before operating the Ejector blow out the steam pipe thoroughly to remove any iron chips, red lead, etc.

To use an Ejector economically regulate the steam with the Starting Valve.

The Hancock "Ejector" is furnished to operate with either steam, air or water.

Please specify on orders the steam, air or water pressure and service required.

CELLAR DRAINERS.



“CLIMAX ”

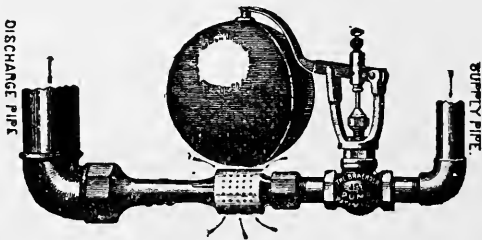
The capacity of a Drainer depends upon amount of water pressure obtainable and lift, and it is advisable to have this information, with conditions under which Drainer is expected to work.

Sizes.	Pressure, Lbs.	Lift. Ft.	Capacity per hour. Gallons.	Pressure, Lbs.	Lift. Ft.	Capacity per hour. Gallons.
1.....	15 to 20	6 to 7	50 to 75	40 to 50	8 to 12	200 to 250
2.....	15 to 20	6 to 7	100 to 125	40 to 50	8 to 12	350 to 400
3.....	15 to 20	6 to 7	150 to 200	40 to 50	8 to 12	550 to 600
4.....	15 to 20	6 to 7	200 to 275	40 to 50	8 to 12	750 to 800
5.....	15 to 20	6 to 7	275 to 350	40 to 50	8 to 12	850 to 1000
6.....	15 to 20	6 to 7	350 to 450	40 to 50	8 to 12	1100 to 1300

These Cellar Drainers are made for draining cellars, wheel pits, furnace pits, etc., at the least possible expense and in a permanent and positively satisfactory manner. They are also desirable and largely used for removing waste water from kitchens below level of sewer and removing drippings from ice boxes, and for any purpose where it is necessary to remove water economically from one level to a higher one.

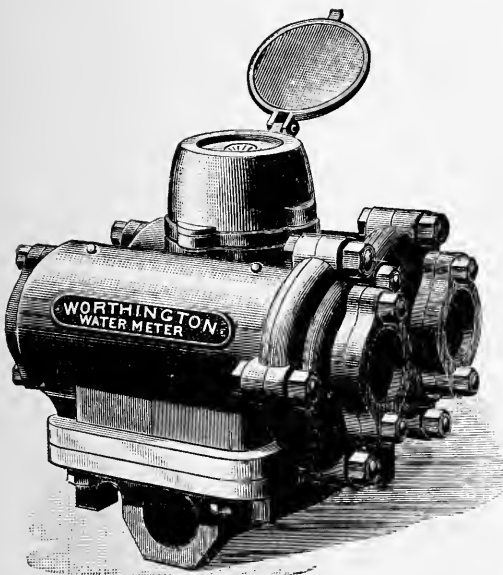
Size No. 1.—Automatic Movement,	\$ 25.00.	Without Automatic Movement,	\$ 15.00
“ “ 2.— “ “	40.00.	“ “ “	25.00
“ “ 3.— “ “	55.00.	“ “ “	35.00
“ “ 4.— “ “	80.00.	“ “ “	50.00
“ “ 5.— “ “	110.00.	“ “ “	70.00
“ “ 6.— “ “	160.00.	“ “ “	100.00

BRAENDER CELLAR DRAINER.



Number of Jet Pump.....	1	2	3
Capacity, Gallons per hour.....	375	600	1275
Size of Water Pressure Pipe (supply) inch.....	1½	¾	1
Size of Discharge Pipe, inch.....	1	1½	2
Weight Complete, pounds.....	6½	8	11
Lift or Height of Point of Discharge, feet.....	12	12	12
Prices .....	\$50.00	\$75.00	\$100.00

THE WORTHINGTON WATER METER.



The parts of the Worthington Meter have been made the subject of careful study, with the result that, as now furnished, the arrangement of counter movement and cap gear will be found a great improvement over that previously used, and it is believed to be superior to any arrangement employed for a similar purpose.

The framework and gear wheels of the counter movement are constructed of the best brass composition, the wheels themselves being accurately cut by means of special machinery, and all the pinions are constructed of German silver, these also being cut with special tools.

The counter is covered with a cast iron box, the lid of which, being raised, the dial can be seen through the glass in the top of the box ; this box is screwed to the body of the meter; and by covering the heads of the screws with sealing wax, stamped with the seal of the water works corporation, it becomes impossible to tamper with the counter movement without breaking the seal.

Should the ratchet movement that drives the counter become in any way deranged in transportation or otherwise, it can be reached by simply removing the counter box, without the necessity of the joints of the meter being disturbed or the water turned off.

TO PUT UP AND START THE METER.—Connect the supply pipe with the meter at the hole marked "Inlet"; the outlet pipe is on a line with the inlet pipe, on the opposite side of the meter ; turn on the water and loosen the brass Vent Screws on the top of the meter, and allow the air to blow through. When water appears at the Vent Screws, tighten them again, and leave the meter to itself, noting the reading of the counter.

SIZES AND CAPACITIES OF METERS.

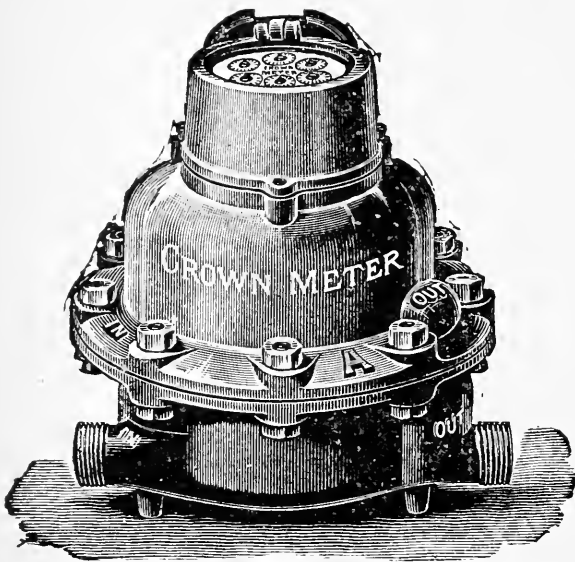
Size of Opening.	Greatest Proper Quantity Per Minute.				Price.	Permanent Box.*	Brass Couplings for connecting the Meters.	Strainers.	
$\frac{5}{8}$ inch pipe	1 $\frac{1}{2}$	Cubic Foot,	or	11 $\frac{1}{4}$	Gallons	\$19.00	\$1.00	\$0.95	\$3.50
$\frac{3}{4}$ "	3	"	"	22 $\frac{1}{2}$	"	28.00	1.50	1.10	3.50
1 "	5	"	"	37 $\frac{1}{2}$	"	39.00	2.25	1.50	6.00
1 $\frac{1}{2}$ "	6	"	"	45	"	45.00	3 75	2.75	6.00
2 "	8	"	"	60	"	55.00	6.00	3.50	7.50
3 "	18	"	"	130	"	130.00	----	2.00	15.00
4 "	60	"	"	450	"	375.00	----	3.00	25.00
6 "	120	"	"	900	"	900.00	----	5.00	----

\*This box has a hinged lid and is made very strong to protect the meter in transportation and while in use. It has suitable openings for the pipe connections. Ordinary rough boxing charged at cost.

The quantities given in the second column of the above table represent a rate of delivery that can be considerably exceeded with this machine, but which had better be accepted as the maximum at which it is advisable to run any water meter continuously. Whenever in the effort to make a small machine answer for a large one, this rate is exceeded and greatly increased wear and tear are invariably the consequence.



CROWN WATER METER.



"A" STYLE.

THE CROWN METER is so well known and its popularity so universal that it does not require an introduction. At the present time it is in use in over 1,700 CITIES AND TOWNS in the United States, the Dominion of Canada and many foreign countries, and it has received the unqualified approval and recommendation of hundreds of our ablest Engineers and Water Works Officials.

The Crown, being positive in its action, will measure with absolute correctness all streams, whether large or small, under all the conditions of fluctuating pressures. Its accuracy has been proved by innumerable tests.

There are four main parts to the Crown Meter: 1st. The Cover, which includes the intermediate gearing, and the counter or registering mechanism. 2d. The Base, which contains the inside cylinder. The Base has the inlet and outlet spuds attached, and is arranged to be bolted to the Cover. 3d. Inside Cylinder. This consists of three parts: the Ring, and the top and bottom Cylinder Heads. The perfection of this Cylinder assists in developing the accuracy of the registration, as this is the part in which the piston revolves. 4th. The Piston. This is practically the ONLY working part. It is made of hard rubber, of about the specific gravity of water. The Piston has no bearing whatever, as it practically floats. It is perfectly balanced, and therefore FRICTIONLESS IN ITS OPERATION.

The entire meter—excepting the Cover and the Piston—is made of composition, consisting of a combination of metals unsurpassed for durability and wear, insuring the greatest possible resistance to corrosion. All Pinions, Spindles, Bearings or parts which have extraordinary wear are made of German Silver.

Size, Inches.	Greatest proper Quantity per minute.	Price.	Con- nections.	DIMENSIONS AND WEIGHT.			
				Length, Inches.	Height over all, Inches.	Width, Inches.	Weight. Lbs.
$\frac{3}{8}$	1 cubic ft. or $7\frac{1}{2}$ gal.	\$12.50	$\$0.37\frac{1}{2}$	6	$7\frac{3}{8}$	$5\frac{5}{8}$	10
$\frac{1}{2}$ or $\frac{5}{8}$	2 " 15 "	15.00	.50	$7\frac{1}{4}$	$7\frac{1}{2}$	7	17
$\frac{3}{4}$	4 " 30 "	23.75	.75	9	$8\frac{3}{4}$	$8\frac{3}{4}$	30
1	8 " 60 "	33.75	$1.12\frac{1}{2}$	$10\frac{7}{8}$	$10\frac{1}{4}$	10	49
$1\frac{1}{2}$	12 " 90 "	62.50		$12\frac{5}{8}$	12	11	59
2	20 " 150 "	81.25		$15\frac{1}{4}$	$14\frac{1}{8}$	$12\frac{3}{4}$	102
3	36 " 270 "	168.75		24	$16\frac{1}{2}$	$15\frac{1}{2}$	214
4	72 " 540 "	312.50		$29\frac{1}{4}$	$20\frac{1}{2}$	21	440
6	120 " 900 "	625.00		$36\frac{3}{4}$	$28\frac{1}{2}$	29	965

SPECIAL NOTE.—The prices mentioned above are the same for meters fitted with the round porcelain dials or for those arranged with the straight-reading registers. The meters arranged with the round dials are known as the "A" Crown, whereas those fitted with the straight-reading registers are classified as "AA" Crown. The "AA" Crown meters are made only in the sizes from the  $\frac{3}{8}$ -inch to the 2-inch inclusive, whereas the Crown meters with the round dials are made in all sizes from the  $\frac{3}{8}$ -inch to the 6-inch inclusive. Unless we are advised to the contrary, we always send the "AA" Crown meters in sizes from  $\frac{3}{8}$ -inch to 2-inch.

# NASH WATER METER.

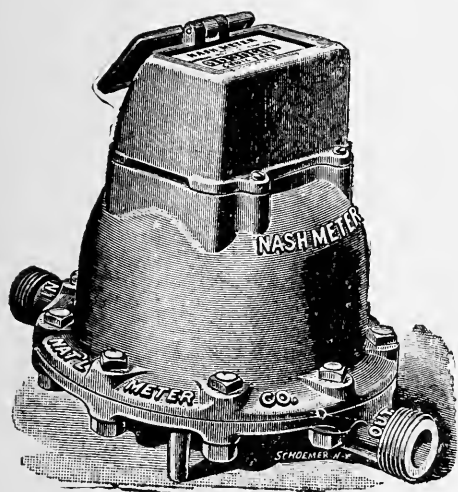


ROUND DIALS. All sizes of the Nash Meter arranged with the round dials will hereafter be known as the "A" Nash. The counter or registering mechanism of the "A" Nash Meter is the same style and construction which have long been used with remarkable success on the Crown Meters. There are now in service thousands of Nash Meters fitted with the round dials, and which have been in continual operation for many years.

"A" NASH METER—ROUND DIAL.

Size, Inches.	Greatest proper Quantity per minute.	Price.	Con-nections.	Length, Inches.	Height over all, Inches.	Width, Inches.	Weight, Lbs.	Weight boxed, Lbs.
$\frac{1}{2}$ or $\frac{5}{8}$	2 cubic feet or 15 gals.	\$10.00	\$0.50	$7\frac{1}{4}$	$7\frac{1}{4}$	$5\frac{5}{8}$	10	14
$\frac{3}{4}$	4 " " 30 "	15.00	.75	$9\frac{1}{4}$	$7\frac{3}{4}$	7	14	20
1	8 " " 60 "	20.00	1.12 $\frac{1}{2}$	$10\frac{7}{8}$	$8\frac{1}{2}$	$8\frac{5}{8}$	21	28
$1\frac{1}{2}$	12 " " 90 "	37.50	----	$12\frac{5}{8}$	11	$7\frac{5}{8}$	35	49
2	20 " " 150 "	62.50	----	$15\frac{1}{4}$	12	$9\frac{1}{2}$	54	72
3	36 " " 270 "	106.25	----	24	$15\frac{1}{2}$	$11\frac{1}{2}$	106	131
4	72 " " 540 "	237.50	----	29	19	$14\frac{1}{4}$	200	240
6	120 " " 900 "	475.00	----	38	25	18	400	445

"AA" NASH METERS.



STRAIGHT-READING REGISTERS. Nash Meters arranged with Straight-Reading Registers are classified as "AA" Nash. Thousands of "AA" Nash Meters are in use in different sections of the country, and it is evident that the Straight-Reading Register is steadily growing more popular, as the demand for it is constantly increasing. The Straight-Reading Register is so simple that every consumer will be able to read his own meter without previous instruction.

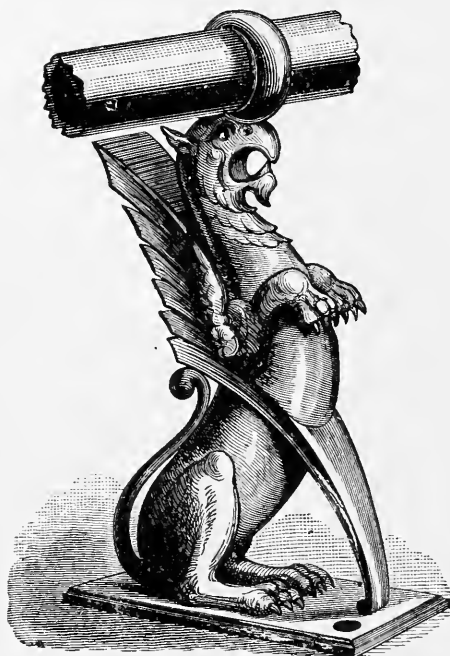
"AA" NASH METER—STRAIGHT-READING REGISTER.

Size, Inches.	Greatest proper Quantity per minute.	Price.	Con-nections.	Length, Inches.	Height over all, Inches.	Width, Inches.	Weight, Lbs.	Weight boxed, Lbs.
$\frac{1}{2}$ or $\frac{5}{8}$	2 cubic feet or 15 gals.	\$11.25	\$0.50	$7\frac{1}{4}$	$7\frac{1}{4}$	$5\frac{5}{8}$	10	14
$\frac{3}{4}$	4 " " 30 "	16.25	.75	$9\frac{1}{4}$	$7\frac{3}{4}$	7	14	20
1	8 " " 60 "	21.25	1.12 $\frac{1}{2}$	$10\frac{7}{8}$	$8\frac{1}{2}$	$8\frac{5}{8}$	21	28
$1\frac{1}{2}$	12 " " 90 "	43.75	----	$12\frac{5}{8}$	11	$7\frac{5}{8}$	35	49
2	20 " " 150 "	68.75	----	$15\frac{1}{4}$	12	$9\frac{1}{2}$	54	72
3	36 " " 270 "	112.50	----	24	$15\frac{1}{2}$	$11\frac{1}{2}$	106	131
4	72 " " 540 "	250.00	----	29	19	$14\frac{1}{4}$	200	240
6	120 " " 900 "	500.00	----	38	25	18	400	445

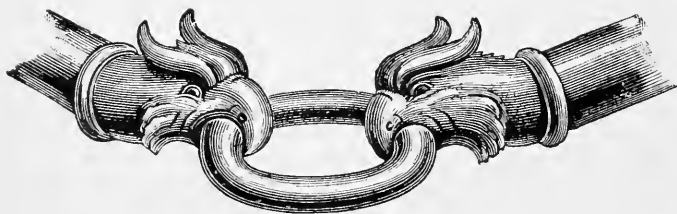
# NASON'S "GRIFFIN" FOOT RAIL BRACKET,

WITH CORNER AND END PIECES.

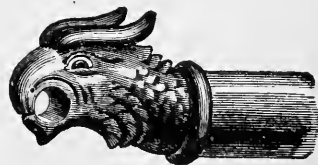
PATENTED 1882.



Foot-rail Bracket.—Large scale, showing design.



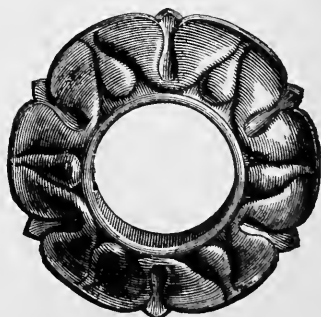
Corner Fitting.—Showing detail of design.



End Piece.



Acorn End Piece.



Rosette, for Railing.

NASON'S "GRIFFIN" FOOT RAIL BRACKETS.—Cont.

CORNER AND END PIECES.

THESE BRACKETS ARE ARRANGED FOR ONE-INCH PIPE.



Foot Rail Bracket, shown as put up ready for use.

It has been our aim in designing the "Griffin Foot Rail Bracket," as illustrated herewith, to produce an article artistic in design, and fitted in form so as to bear the heaviest strain with the least possible chance of disarrangement, while at the same time a model of lightness.

It is almost impossible to fasten the foot rail to the bar itself and render it thoroughly secure and permanent; but with the "Griffin" bracket this object is secured, as the support comes from the floor, and is directly under the line of the heaviest strain, whereas, in the other case the foot-rest itself acts as a lever to loosen its own support.

Their design is artistic, and their lightness and beauty of form is such that they add to, and improve the appearance of, the most handsomely fitted-up surroundings; while in point of cleanliness they far surpass the gaping "Y" support now so commonly used, as they present no interstices where dirt of any kind can gather.

It may be mentioned that where rails with the old form of bracket are in use, the latter can be removed and substituted with the "Griffin" pattern without discarding the rail, and considerable expense be thus saved, while the handsome effect of a new rail will be given. We manufacture them in plain or galvanized iron, bronze and brass, and will furnish them at the following prices, net:

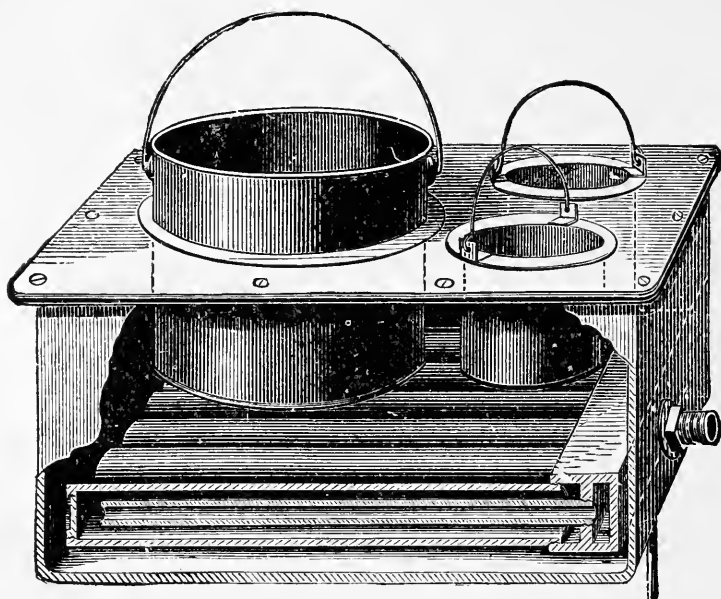
	Plain Iron.	Bronzed Iron.	Galvanized Iron	Artistic Brass.
Brackets.....	.50	.85	.85	3.50
Corner Fittings.....	.50	.75	.75	3.00
End Finish Fittings.....	.15	.25	.25	1.40
Acorn End Pieces.....	.10	.18	.18	.65
Rosette for Railing.....	.08	.15	.15	.50

Or we will furnish estimate for fitting them up with the necessary rail, complete, in the very best manner.

**These Brackets and Fittings are only made for One Inch Pipe.**

NASON'S STEAM HEATER.

FOR GLUE, PASTE, ETC.



As shown above, the heater consists of a cast-iron box with cover, in which there are holes of suitable size to receive such pots as may be desired.

The heating surface consists of horizontal tubes screwed into a header, each of which has a smaller tube within it through which the steam enters, and a positive circulation—even under low pressure—is insured.

Exhaust steam being frequently used for heating purposes, the tubular form of the heating surface gives abundant heating area, and its efficiency is so greatly increased thereby that as good results are reached as if high pressure steam were connected to the heater.

Three sizes are made, numbered 1, 2 and 3, and below will be found a list of the regular sizes and number of pots which are commonly made for each heater.

Extra pots of the several sizes and materials are kept in stock and can be furnished as wanted.

Numbers.....	1	2	3
Sizes of Covers, inches.....	11 x 15½	16 x 22½	16 x 28¾
Depth, inches.....	7	9	9
Sizes and Numbers of Pots fitted up for each size .....	Two 5 in. only, or, One 8 in. only, or, One 9 in.	Six 5 in. only, or, One 10 in. and Two 5 in.	Two 12 in. only, or, One 12 in. and Four 5 in. or, Eight 5 in.
Price, without pots.....	8.00	16.00	20.00

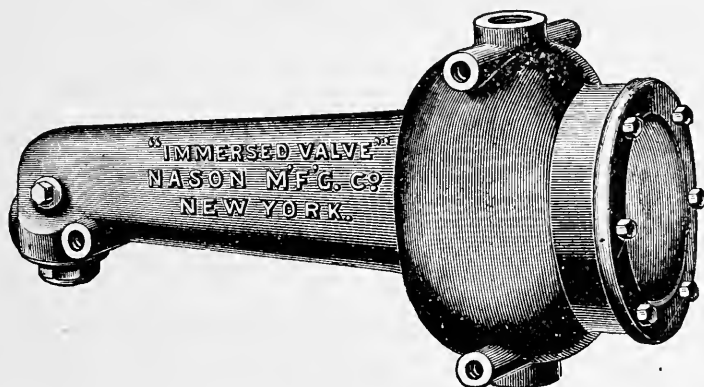
COPPER POTS FOR GLUE HEATERS.

Diameter, inches.....	5	6	7	8	9	10	12
Dep h, inches.....	5	5¾	7¼	7½	7½	8	8
Price.....	2.00	2.25	2.50	3.50	4.00	4.50	5.50

Galvanized Cast-Iron Pots, 5 inch, 75 cents each.

We can furnish a number of additional sizes of covers for above Heaters.

## NASON'S "IMMERSED-VALVE" BOILER FEEDER.



As hitherto made, all Automatic Water Feeders for boilers have been so constructed that the valve which governs the amount of water requisite for the boiler has been placed at the top of the Feeder, where the rubber seat is constantly exposed to the destructive action of steam, which is at or above a temperature of 212°

This rapidly destroys the gummy nature of the rubber in the valve, leaving behind it a hard residuum which speedily crumbles and it has therefore at frequent intervals to be renewed.

The difficulty has now been avoided by inverting the valve, its position being beneath the water, where as it is always kept wet and at a lower temperature, its durability is thereby greatly increased.

In making this alteration all the former valuable features of our Feeder have been retained, and while the alteration has added to their cost of manufacture their price has not been increased.

Among its most important advantages are the following:

All the copper floats used in them are made "extra strong" and carefully tested under pressure, in order to avoid to the greatest possible extent a danger common to all of them, that of collapsing,

The lever connecting the float with the valve is made as long as the form of the casing permits, a quarter turn in it between the valve and fulcrum enabling all interior space to be fully utilized.

Easy access is had to the valve with the least possible trouble by removal of the brass cap immediately below it; and the large opening facilitates its replacement with a new one, if injured or worn out.

All the valves are packed with Jenkins' packing, secured in a containing cup to give them the greatest possible endurance.

It is not advised that these Regulations be attached to boilers where the pressure exceeds twenty pounds, although as a matter of precaution, they are carefully tested to fifty before leaving the factory.

They may be used with or without a gauge glass, to be placed upon either side—holes being tapped for this purpose.

Outlets for the glass gauge are made on both sides of the Feeder in order that it may be connected in either side of the boiler as most convenient.

### DIRECTIONS FOR USING.

Place the regulator near the boiler at such a height that its centre coincides with the line at which it is desired to maintain the water level in the boiler.

Connect the top opening on the large end of the receiver with the steam dome of the boiler above the water line, and the bottom opening with the boiler at some point below the water level.

The Feed Water connection is then to be made with the small end of the Feeder—care being taken in all cases to ascertain that the pressure in the water supply exceeds the greatest amount of pressure which the boiler is ever to be used under.

For the benefit or purchasers, the following dimensions are given, which may be of assistance in connecting the Feeder.

Outside Length.....	23 1/4 inches.
Height.....	13 3/8 "
Width.....	9 "
Size of Boiler Connection.....	1 "
Size of Gauge Glass Connection.....	1 1/2 "
Size of Feed Water Inlet.....	1 1/2 "
Price without Water Gauge.....	\$20.00
With Water Gauge, complete.....	24.00



**IMPORTANT.**

Note change in prices taking effect this date, 1st January, 1898.

**VALVES, FITTINGS, GAUGES, ETC.****FOR ANHYDROUS AND AQUA AMMONIA—ADAPTED TO AMMONIA MACHINERY FOR ICEMAKING AND REFRIGERATING PURPOSES.**

The revised and enlarged price list herewith submitted for our Ammonia specialties supersedes all earlier lists. As in the past, a special alloy of cast iron and steel will be used in these castings and the same exacting test of 500 to 1,000 lbs. pressure placed upon them. The same care will also be given to the cutting of threads, so that our patrons may be assured of the absolute reliability of the joints and the perfect integrity of the fittings. The great popularity of our ammonia fittings renders exhaustive description unnecessary, yet we wish again to invite attention to the "NASON" Joint, originated by us, and which we are always willing to guarantee under all usual conditions of ammonia service. The construction of the joint is as follows:

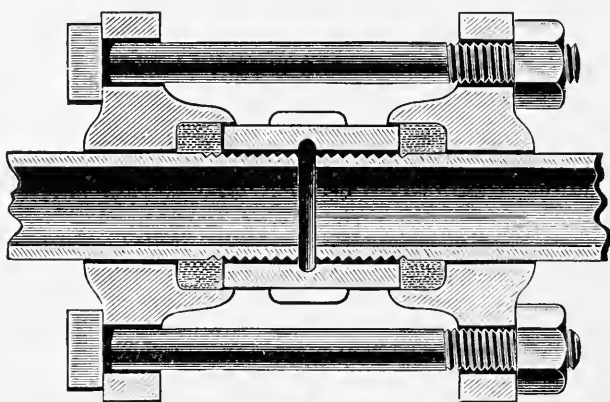


FIG. 1.

The ends of the pipes to be connected being first threaded as for an ordinary fitting, they are then screwed into the fitting securely, and the addition of a stuffing-box with gland and rubber washer above the thread (as shown in Fig. 1) perfectly closes the joint when tightened down, rendering leakage impossible.

Owing to the largely increased use of artificial refrigeration during the past few years, and the great strides made toward the perfection of this class of apparatus, we have found it necessary from time to time to make additions to our patterns for Ammonia Specialties, in order to meet the increasing demand and varied requirements of the different machines placed on the market; so that our list as now submitted will be found full and complete, covering all fittings generally used in ammonia apparatus, whether of large or small capacity, and of either the Compression or Absorption type.

Among the many good features which have tended to increase the popularity and demand for our ammonia fittings, their absolute reliability is not the least; and we wish to assure our patrons that the same care will be used in their manufacture as in the past and that the same dependence may be placed upon their perfect integrity.

An alloy of cast-iron and steel is used in making the castings; the threads are cut with every care and carefully examined; and on the completion of all fittings they are subjected to a rigid pressure of from five hundred to one thousand pounds—such as are found in any way imperfect being rejected.

We wish also to call attention to the increase in our list of sizes and patterns for special fittings for Brine Circulation—particularly in the group of Return Bends. As the circulation of cold brine as a cooling agent has become almost universally recognized as the safest and most effective method of reducing temperatures in cellars, beer vaults and cold storage buildings, we have found it necessary to increase our line of patterns and fittings for this service, with the view of placing on the market return bends and elbows having both greater distances between centres and longer curves to reduce friction in circulating brine through them.

The bends here shown are cast-iron, but our shops are fully equipped with special tools for turning out bends and elbows from wrought-iron pipe, either common or extra strong, bent to any practicable radius, and threaded as may be required. Prices for these are also given.

Attention is also called to the revised list of sizes as now published, covering our assortment of patterns for ammonia headers, to which we have recently made considerable additions, so that all reasonable requirements in this direction can now be met.

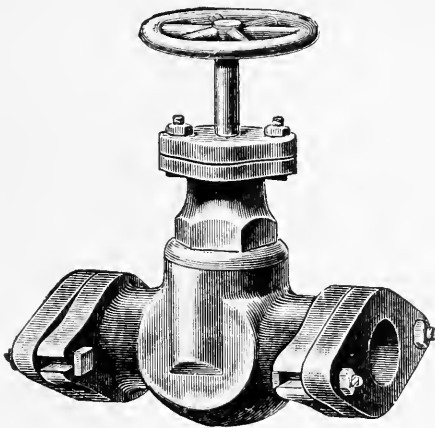
As will also be seen, we have now a complete line of Ammonia Check Valves up to and including three and a half inch.

Finding that the growing (and usually urgent) demand for our Ammonia work warranted us in so doing, we have introduced in our shops, for this particular branch, improved machinery specially designed, in order that all material sent out may be of first-class workmanship and thoroughly tested, and also with a view of always carrying a full line in stock, which we are confident will be appreciated by our customers and lead to a more extended introduction of these goods throughout the country.

We take especial pleasure in referring to many of the largest users of ammonia, and solicit correspondence, when fuller particulars will be given, if requested, and special rates named on specifications submitted.



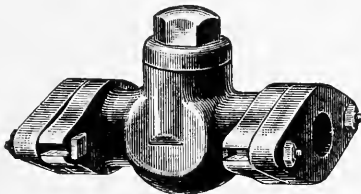
GLOBE AND ANGLE VALVES.



Sizes, inches.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5
Gland Ends.....	3.00	4.00	5.00	6.50	8.00	9.00	11.80	17.00	22.00	29.00	75.00	94.00	122.00

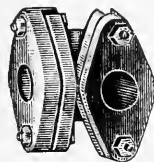
NOTES.—Sizes from 1¼ inch to 3 inch inclusive, can be furnished with Flanged Ends without additional charge.  
Sizes 3½, 4, and 5 inches have Flanged Ends only. They are Extra Heavy and have Finished Bonnets and Flanges.

CHECK VALVES.



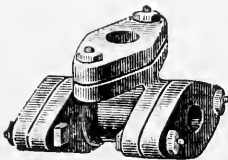
Sizes, inches.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½
Gland End, each.	2.15	3.00	3.50	4.50	7.50	8.50	9.50	10.25	15.00	18.50	60.00

ELBOWS.



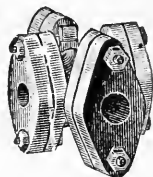
Straight Sizes, inches.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5
Gland End, each.....	.50	.65	.80	1.05	1.60	2.15	3.05	4.20	6.80	11.00	12.00	14.00	20.25
Reducing Size, G. E., each,	.70	.90	1.05	1.40	2.10	2.70	3.80	5.35	8.30	13.50	15.00	18.00	25.00

T E E S .



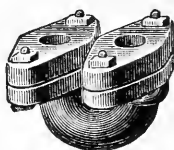
Straight Sizes, inches.....	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5
Gland End, each.....	.75	1.05	1.20	1.55	2.50	3.00	4.40	7.75	11.00	15.50	18.00	19.00	25.00
Reducing any one opening { to one size, G. E., each.. }	.95	1.30	1.55	2.05	3.25	3.75	5.40	9.75	13.25	18.75	22.00	24.00	30.00

## CROSSES.



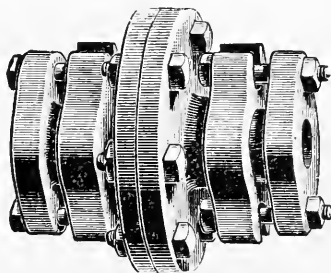
Sizes, inches.....	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$
Gland End, each.....	\$1.52	1.80	2.30	4.00	5.00
Reducing any one opening to one size, Gland End, each,	1.75	2.25	3.00	5.00	6.00

## RETURN BENDS.



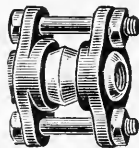
Sizes, inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Distances, center to center, inches..	$2\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{3}{4}$	$3\frac{3}{4}$	$4\frac{1}{2}$	$5\frac{1}{8}$	$5\frac{1}{4}$	$5\frac{1}{4}$
Gland End, each.....	\$1.50	2.00	3.00	5.00	5.00	6.20	7.50	9.50

## FLANGE UNIONS.



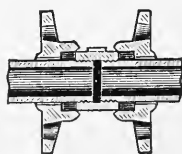
Sizes, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5
Gland End, each....	\$3.35	4.30	5.35	6.60	8.25	11.40	14.00	15.50	20.00	24.00	29.00

## UNIONS "BOYLE" PATTERN.



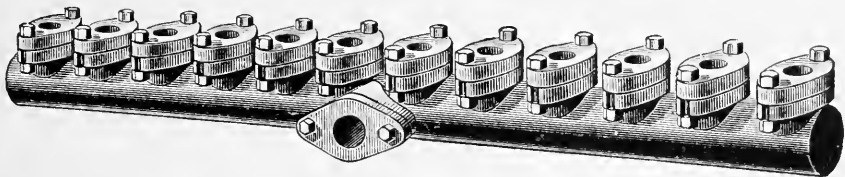
Sizes, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Each.....	\$ .38	.53	.68	.90	1.20	1.50	2.15	2.80	4.80	6.20	9.00

## COUPLINGS, INCLUDING BOLTS.



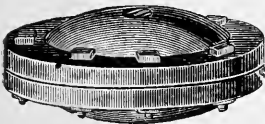
Sizes, inches.....	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Each.....	\$ .38	.53	.68	.90	1.20	1.50	2.15	2.80	4.80	6.20	9.00

BRANCH TEE HEADERS.



Number of Branches.....	3	4	5	6	7	8	9	10	11	12
Price 1 in. Outlets.....	\$7.75	9.25	10.50	12.00	13.25	14.50	16.00	17.25	18.75	20.00
Price 1¼ in. Outlets....	9.25	11.00	12.50	14.25	17.00	17.50	19.25	20.75	22.50	24.00
Price 1½ " " ".....	12.00	14.00	16.00	18.00	20.00	22.00	24.00	26.00	28.00	30.00

Back Outlets from ¾ in. to 2½ in. } without extra charge.  
Side " " ¾ " " 2 " }

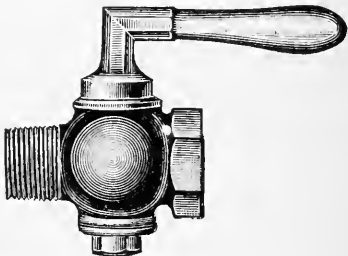


AMMONIA STRAINERS.

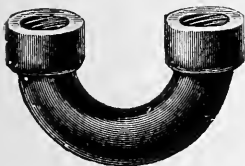
Sizes.....	1	1¼	1½	2
Each.....	\$11.00	12.00	13.50	15.00

BRINE COCK—BRASS.

Sizes.....	1	1¼
Each.....	\$2.20	3.00



RETURN BEND FOR BRINE COILS.

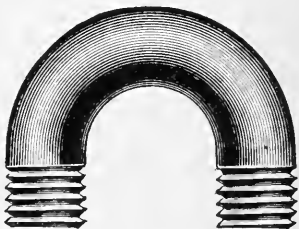


Return Bends, 1 inch, 3½ inch center, each .....	\$0.35
" " 1 " 4 " " " .....	.38
" " 1 " 6 " " " .....	.50
" " 1¼ " 4 " " " .....	.45
" " 1¼ " 6 " " " .....	.60
" " 1½ " 7 " " " .....	.75
" " 2 " 6 " " " .....	.90

Cast Iron Return Bend.

WROUGHT IRON RETURN BEND.

Sizes, inches.....	½	¾	1	1¼	1½
Distance to Centres, inches...	2	3	5	7	9
Extra Heavy Pipe, each.....	.65	.95	1.35	1.75	2.35
Sizes, inches.....	2	2½	3	3½	4
Distance to Centres, inches...	12	16	24	28	32
Extra Heavy Pipe, each.....	3.15	4.75	6.75	9.25	12.75



Wrought Iron Return Bend.

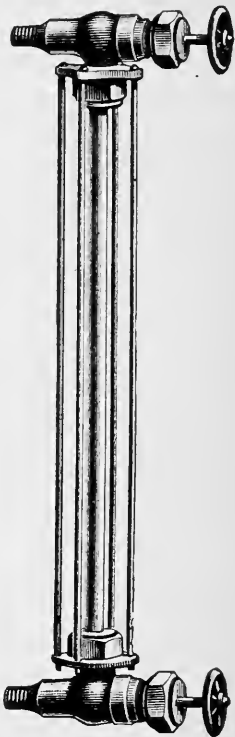


WROUGHT IRON QUARTER BEND.

Sizes.....	½	¾	1	1¼	1½
Radius, inches.....	1	1½	2½	3½	4½
Extra heavy pipe, each.....	.40	.55	.75	1.00	1.30
Sizes.....	2	2½	3	3½	4
Radius, inches.....	6	8	12	14	16
Extra Heavy Pipe, each.....	1.70	2.50	3.50	4.75	6.50

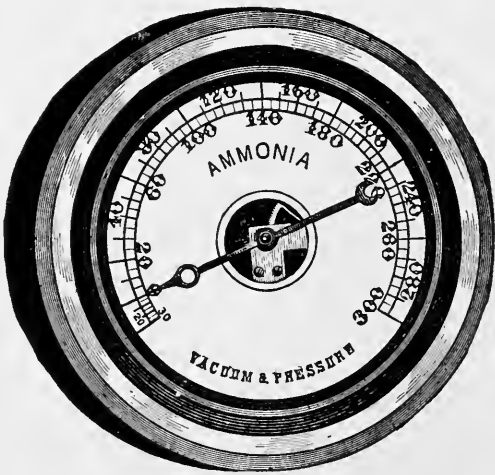
AUTOMATIC AMMONIA GAUGE.

Containing our Safety Attachment, and so arranged as to close automatically in the event of the breaking of the glass tube, thus enabling the engineer to at once approach the apparatus without danger of coming in contact with escaping gas.



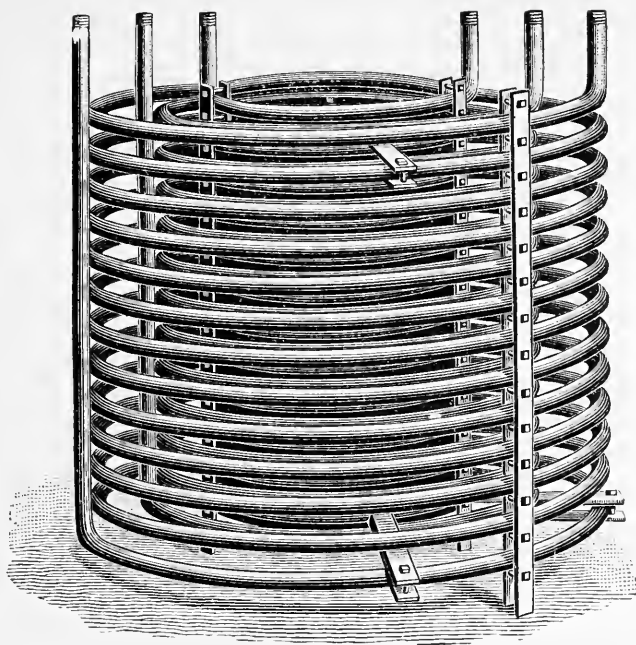
Price, complete, including Guards and Glass, threaded 1/2 inch.....	10.00
“ “ “ “ “ “ Extra Heavy, threaded 3/4 inch.....	15.00

PRESSURE AND VACUUM GAUGE.

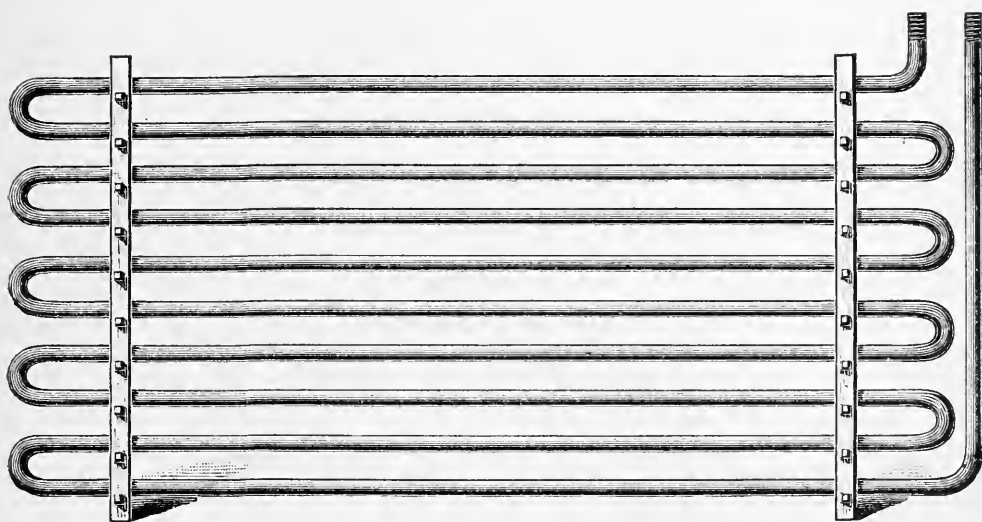


SIZES.	IRON CASE AND RING.	IRON CASE, N. P. RING.
8 1/2 inch Dial.....	45.00	45.75
6 3/4 “ “.....	40.00	40.60
6 “ “.....	35.00	35.50
5 1/2 “ “.....	30.00	30.50
4 1/2 “ “.....	25.00	25.50

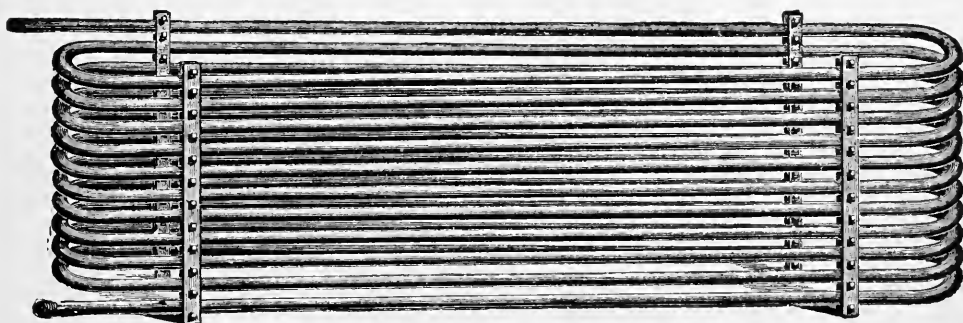
In ordering state whether a Compound Scale, showing Pressure and Vacuum, or Pressure only, is required.



"NEST" OF CIRCULAR COILS.



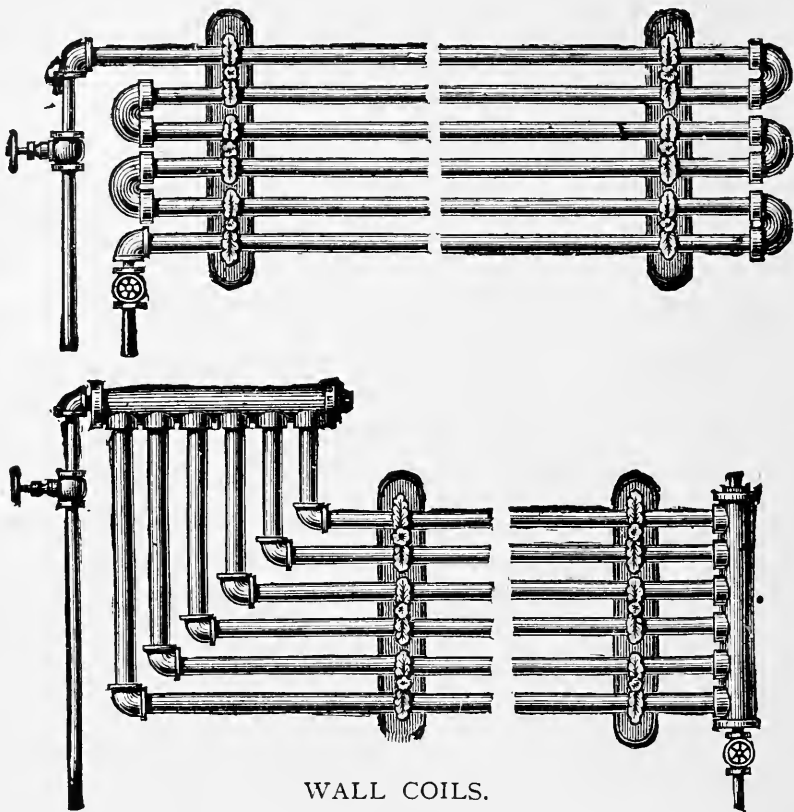
TROMBONE COIL.



RECTANGULAR COIL.

PRICES FURNISHED ON APPLICATION.

IRON PIPE COILS.



WALL COILS.

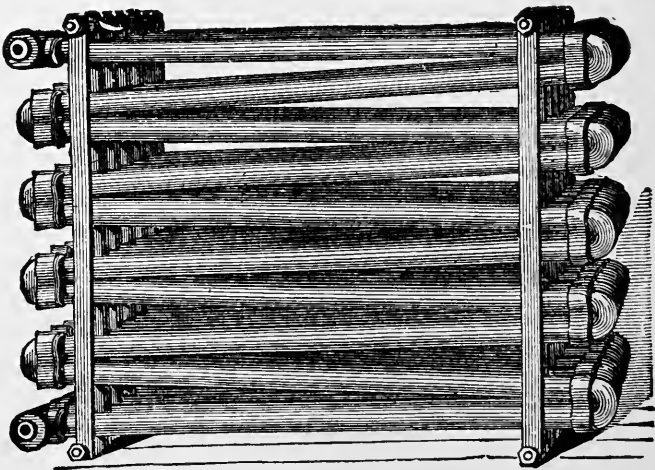
Any size made to order. Prices furnished upon application.



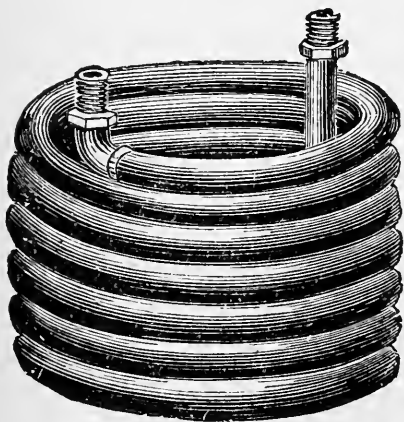
CIRCULAR TANK COILS.

Size of Pipe.....	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Price, per foot.....	\$0.40	.50	.62	.84	1.07	1.36

BOX COILS.



HEATER COILS.



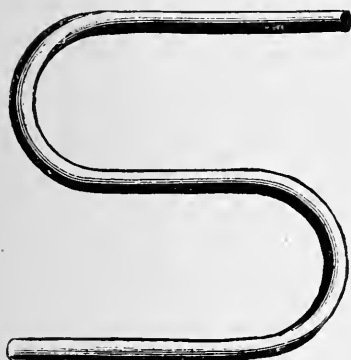
HEATER COILS.

Size of Pipe.....	$\frac{1}{2}$	$\frac{3}{4}$	1
Price, per foot...	\$0.36	.46	.57
Size of Pipe.....	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Price, per foot...	\$0.76	1.00	1.25

BOX COILS.

Length of Pipes, feet .....	3	4	6
Price, $\frac{3}{4}$ -inch Pipe, per foot.....	\$0.26	.22	.18
" 1 " " " .....	.34	.29	.24
Length of Pipes, feet.....	8	9	10
Price, $\frac{3}{4}$ -inch Pipe, per foot .....	.16	.16	.15
" 1 " " " .....	.22	.20	.20

COILS OF ALL DESCRIPTIONS.



"S."



"U."



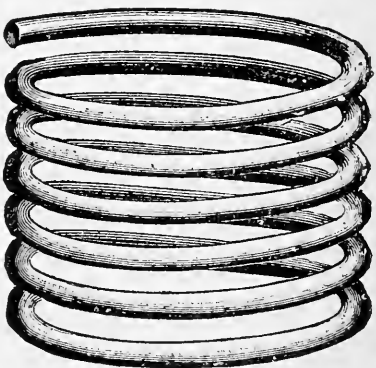
Spiral Flat.



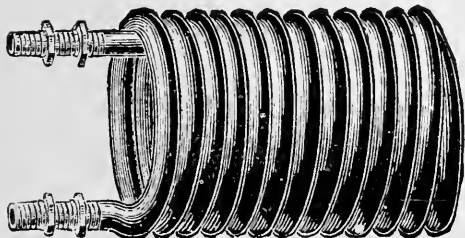
Frustrum.



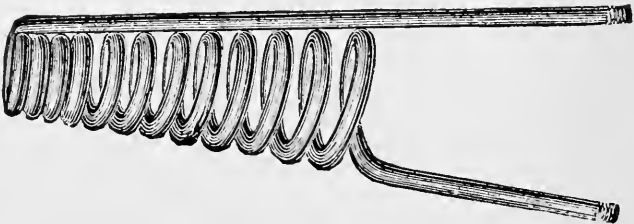
Double Cone



Heater.



Double End Heater.



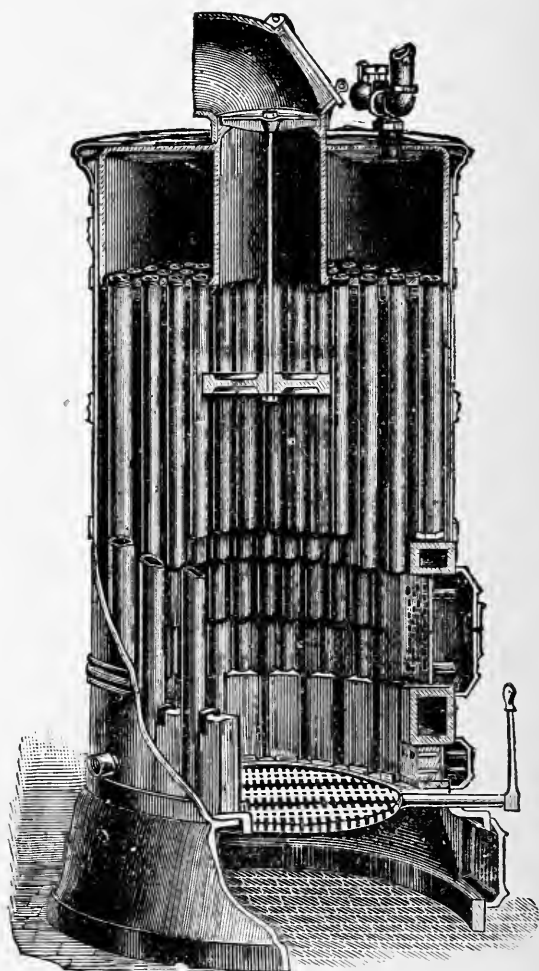
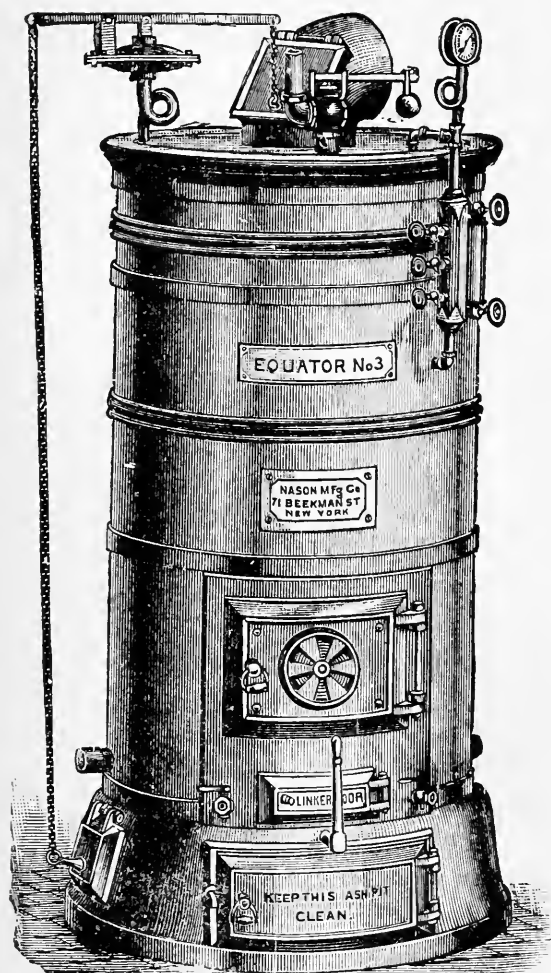
Tuyere.

Prices on Application.



## NASON'S NEW STEAM AND HOT WATER HEATERS.

PATENTED OCTOBER 28TH, 1890.



With this edition of our catalogue, we take pleasure in presenting our improved "EQUATOR" (steam) and "GULF STREAM" (hot water) Heaters, showing our new design sectional shaking and dumping grate, and other minor features tending to perfect and further enhance their already well-known superior qualities.

### 'THE "EQUATOR."

In planning this heater, the following features were borne in mind, and all the requirements will be found to have been met, on an examination of the heater and its method of construction.

The surface must be large as compared with the area of the grate.

It must be as far as possible all of it exposed to the direct rays of the fire.

The fire door must be large for convenience of firing.

The fire box must be deep and roomy in order to give a large combustion chamber, and also serve as a liberal receiver to contain coal over night.

The grate must be of the shaking pattern, and arranged to dump readily without opening the fire or ash pit doors.

The door for regulating air supply under the grate should be separate from the ash pit door in order that it shall be always clean, and also to avoid the annoyance of a chain on the heater front, where it is likely to interfere with the ready use of both fire and ash pit doors.

A proper mud drum should be provided, in which accumulations of dirt or scale will settle, from which they may be drawn at the convenience of the person in charge of the fire.

The heater must evaporate a large amount of water for each pound of coal burned in it, or for EACH DOLLAR SPENT FOR FUEL.

In construction the heater is of the drop tube type, the reservoir on top being constructed of cast iron, and the tubes of mild steel.

Into the bottom head or crown sheet—the latter being strengthened by suitable braces—are screwed a number of one inch drop tubes, excepting on the outer row, where for the purpose of stiffening the heater for shipment  $1\frac{1}{2}$  inch tubes are used. The lower ends of all these tubes are closed by our patent welding process, and into each is fitted a wrought iron diaphragm—their thickness being four Nos. heavier than that used for radiators.

This insures an active circulation in all of them—water passing down on one side and up the other, conveying the steam bubbles into the reservoir above, where it separates from the body of water.

The smoke and gases after passing over the tube surface are discharged through a central tube in the steam cylinder—a baffle plate compelling them to thoroughly circulate among all the tubes before they pass into the chimney.

In a heater of this type we have found it practicable to get as large a ratio of heating surface to grate surface as 40 to 1—this being at least 25 per cent. more than any other house steam heater now in the market.

Between each of the  $1\frac{1}{2}$  inch tubes, at their lower ends, is inserted a fire brick made expressly to fit their shape, which serve the purpose of keeping the exterior of the fire from coming directly in contact with the cooler surface of the pipes, which would hinder combustion and make the fire sluggish.

At the same time the pipes keep the fire bricks partially cooled so that they are not injured to the same extent as where a furnace is entirely lined with brick.

Attention is called to the casing—the inner surface of which is made of  $\frac{1}{4}$  inch asbestos board, covered by heavy galvanized or Russia-iron; this being held in place by wrought iron bands clamped together at the back with bolts. In this construction, a neatness of appearance is attained which can be got in no other way; and if necessary at any time the casing can be removed and replaced in less than an hour.

The fire door is surrounded by a hollow cast-iron casting, which is connected to the steam reservoir above by two  $1\frac{1}{2}$  inch pipes, and through these all dirt in the heater gradually settles, all sediment being driven out of the smaller tubes by their activity of circulation, and the accumulation is drawn from the bottom of the casting through a cock left there for that purpose.

In a heater of this type it is obviously impossible to empty water from the tubes by drawing off, and, foreseeing the possible danger from freezing, we made a carefully conducted series of experiments to ascertain what the probability of accident from this cause would be.

We developed the fact that when water freezes in the tubes the ice, instead of exerting its expansive force transversely, is forced up into the drum of the heater without causing any injury to the tubes whatever.

Where it is thought best for any reason to expel the water from the tubes, it can be always done by building a light fire of shavings in the heater. But this we do not recommend except when done by a competent engineer, as there may be danger of causing leakage by overheating.

In ordinary practice there is no objection whatever to leaving the water in the tubes, and we are willing to guarantee all our heaters of this type against any damage whatever occurring from this cause, providing the water is drawn from the steam drum and fire-door casing.

Customers are invited to see samples in our office of heater tubes which have had water frozen in them.

The main body of water in the heater is drawn from the bottom of the mud drum, which operation also empties the latter at the same time.

Each heater is furnished with a complete set of Water Gauges, Gauge Cocks, Safety Valve, Automatic Damper for regulating the draft, Check Draft on top, and a complete set of fire tools.

Further information with prices furnished upon application.

### DROP TUBE FIRE SURFACE.

Almost the entire fire surface of the heaters is made up of drop-tubes suspended directly into the fire-box. It is at once obvious that their position with relation to the fire is such that every square inch is directly exposed not only to the heated products of combustion, but to direct radiation of the heat from the fire itself. The lower ends being securely welded, their only joint is at the upper end where they are screwed into the tube sheet of the heater, at which point the temperature of the gases is so reduced that injury from burning is impossible. Almost all of this surface is exposed directly to the fire itself, so that the remarkable result in evaporating efficiency attained greatly exceeds that of any other house steam or hot water heaters made or sold.

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### CIRCULATION IN TUBES AND THEIR EVAPORATIVE DUTY.

By the construction above described, provision is made for the rapid vertical flow of water in each tube, independent of all others. When water is heated it becomes of lesser specific gravity, and as a consequence there is a tendency of the hot water to rise vertically, the cooler water descending on the other side of each diaphragm to take its place; and in passing through a heater, the circulation in any other direction necessarily retards it. Whenever the whole body of water in any heater flows in one long or devious circuit, as in the case of all flat disc or horizontal tube heaters, it of necessity moves slowly, and when the fire is strong, with more or less noisy ebullition; but the water in our heater flows in many independent short vertical circuits, and its movement is consequently very rapid, the distance traveled from the fire surface to the point of release being short; as a consequence steam passes rapidly to the steam-dome, ebullition is very quiet and the production of large bubbles on the heating surface is avoided. This rapid circulation also insures freedom from deposit at the bottom of the tubes, it having been demonstrated with a heater of a type like this that lead shot can be thrown out of the tubes by rapid circulation.

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### SELF CLEANING.

Not least among the many excellent features of vertical tubes is that no soot or dust can collect by gravity on the fire surfaces, while upon every flat portion of the tube, disc, or horizontal heaters, whether of the water-tube or fire-tube class, a large collection of detritus is inevitable. These heaters are thus entirely "*self cleaning*."

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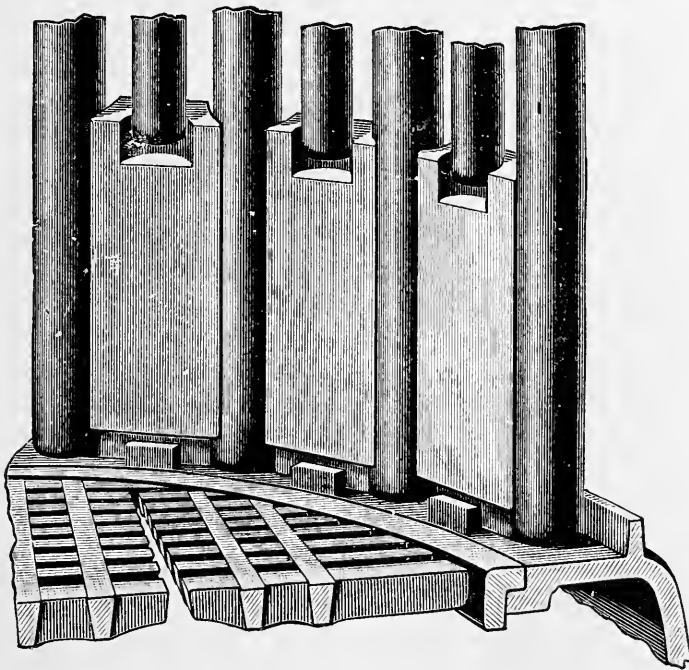
### DIAPHRAGMS AND THEIR DURABILITY.

As the question may be asked as to the probable life of a diaphragm placed in a tube for the establishment of circulation, we promptly answer that it will be at least as long as that of the whole apparatus. No deterioration is observable in the diaphragms of vertical tube radiators, which have been in use for more than thirty years past, and where the conditions are less favorable than in a heater, the radiator sheet iron being thinner than that used for the drop-tube diaphragm.

Their destructibility is practically unknown. We have in many instances for purposes of examination into this point removed diaphragms from radiators which have been used for over twenty-five years, and found them practically as good as when first made, the original scale and marks on the surface of the iron being still intact. In the case of a heater, where the tubes are constantly immersed in water, the condition is much more favorable for the preservation of diaphragms than in radiators that are alternately subjected to contact with steam or air.

### FIRE TILE LINING.

This feature, as here illustrated, is one of the most important in both the "GULF STREAM" and "EQUATOR" heaters.

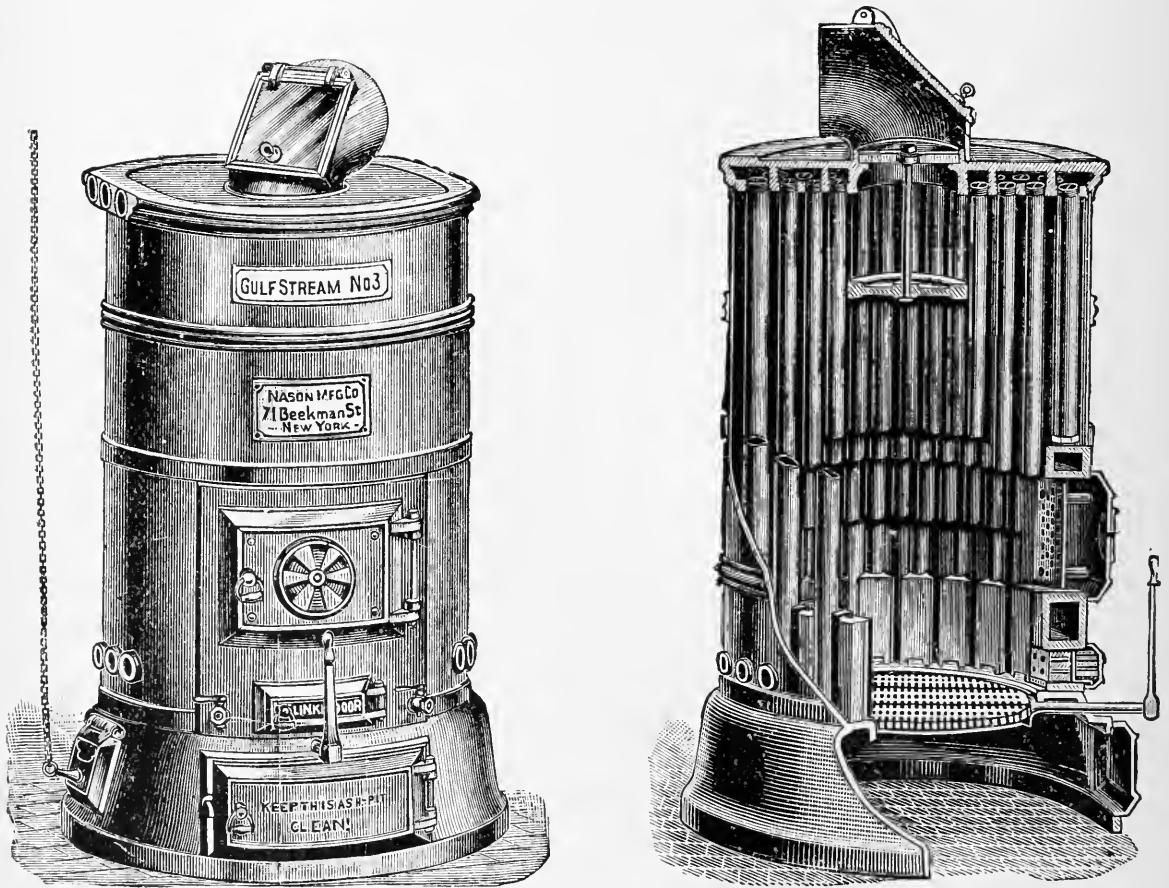


SECTION OF FIRE-POT.

Each size of heater requires a separate pattern moulded so as to exactly fit the space between the tubes. They are kept in stock and can be shipped immediately on order by mail or telegraph.

The cut shows distinctly the mode of insertion. Each tile is notched on the top sufficiently to allow it to be raised enough to pass over the small lug which holds each in place at the base. No cement or setting is required; the weight of each brick and its form hold it positively in place, and their renewal is so simple a matter that it can be done by any housekeeper without calling in the services of a steam-fitter or machinist.

## THE "GULF" STREAM HOT WATER HEATER.



This heater is similar in construction to the "Equator," except that the steam dome, instead of being of large size to allow the separation of steam from the water, is cut down in height, so as to merely serve the purpose of conducting the water to the tubes and away from them after it has been heated.

The same large proportion of surface to grate is maintained, and the heater is precisely similar in all respects, except that the flow and return connections, and the trimmings are different.

## REMOVAL OF ASHES.

Too much emphasis cannot be placed on the necessity of keeping the ash-pit free from ashes, which are liable to accumulate through carelessness or laziness of servants.

The ashes should be regularly removed at least once a day and placed in an iron ash barrel.

If ashes are allowed to accumulate, the grate bars will inevitably be made red hot, which warps and destroys them in a short time.

A grate, with proper care, will last for several years, or on the other hand the best grate may be spoiled in a day or two by a careless disregard of the above directions.

Both the "GULF STREAM" and "EQUATOR HEATERS" require no attention whatever as to cleaning. Their construction is such that, unlike other heaters, they clean themselves, and the fire surface is always free from soot and dust, and much dirty work and loss of heat is thus avoided.

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## DIRECTIONS FOR SETTING UP.

1st. Place the bottom casting on the smooth cellar floor where it is to stand, as near the chimney as possible so as to avoid a long horizontal smoke pipe.

The floor should be smooth, and about the heater, covered with brick or stone when possible.

2d. Place the two half pieces which encircle the grate in position, care being taken that the opening left in the ring for the projection of the grate spindle comes opposite the hole in the front of the base-casting. Then place the grate in position, allowing the spindle to project through the front.

3d. Raise the heater, taking care to avoid bending the outside tubes, and place it upon the bottom casting. Where practicable this can be most easily done, for the larger sizes, by screwing an eye-bolt into the bottom of a timber, directly over the place where the heater is to stand and then hoist it into position.

4th. Place the loose pieces of fire-brick between the outside row of tubes inside the fire-box. It will be noticed that they are so shaped that, when placed in position, they will remain there of their own weight.

5th. Put the semi-circular pieces of iron outside the outer row of tubes and secure them in place with the bolts provided.

They are for the purpose of holding the asbestos covering in position, keeping it a slight distance from the pipes and thus allowing the ashes to sift in from the fire-box; as they make a good non-conducting lining in addition to the asbestos.

6th. Wrap the asbestos covering around the heater and tie with wire. Its position is clearly shown by the openings in it and by the marks in paint at the joints.

7th. Put the galvanized iron casing outside the asbestos and bolt up the wrought iron straps, giving tension enough to hold the whole securely.

8th. Put on the trimmings as shown in the accompanying cuts.

NOTE. In order to bring the galvanized iron casing into position before bolting on the girth straps, it may be found convenient to place a turn of wire once around the jacket, tightening it by twisting with a piece of steam pipe or stick, to draw the edges into place.

## OUR "PERFECTED" GRATE.

A demand having arisen for a Grate to be used in association with our Equator and Gulf Stream Heaters, which would more perfectly control the fire and its management, we have devised a form which is distinctly new in many of its features ; and after a careful trial the Grate is now for the first time offered, and all our Heaters sent out in the future will be equipped with it.

An examination of the accompanying cuts will sufficiently show its construction and general operation. Fig. 1, is the Grate ready for use ; Fig. 2, the bars in position for dumping the fire, and Fig. 3, a section of the ash-pit and bars.

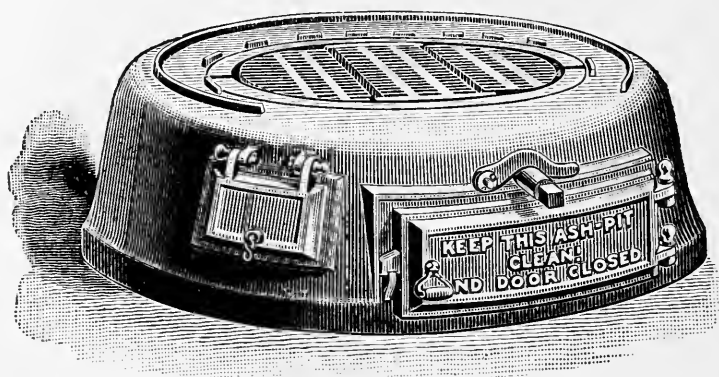


Fig. 1.

GRATE SET READY FOR USE.

It will be noticed that each bar is formed with two lateral stays running its whole length to the trunions, instead of one as is commonly used. Across the stays are ties with short pieces or fingers extending on both sides. This method of construction gives greater stability, with less weight, than with any other form, and also largely increases air space, ensuring both better combustion, and cooler bars, with their consequent longer life.

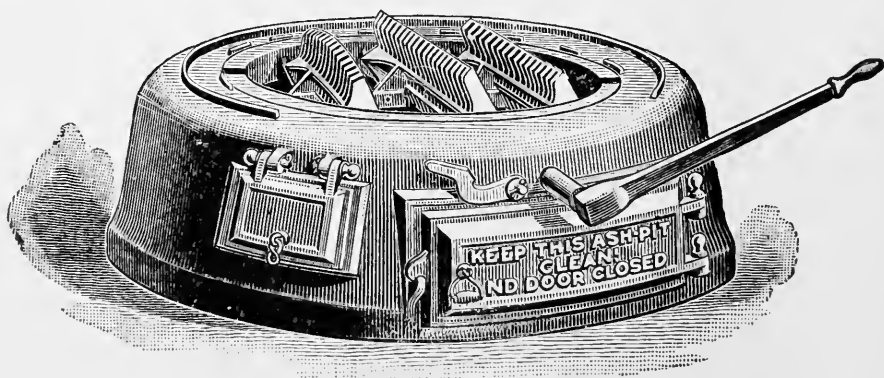


Fig. 2.

POSITION IN DUMPING.



Shaking the Grate is accomplished with a handle attached to the center bar spindle; motion to the left being arrested by the Grate striking the ring, and to the right by means of the pawl which catches in a notch in the spindle provided for it.

When it is desired to dump the entire contents of the fire box the pawl is thrown back to the left, leaving the spindle free to make a quarter turn to the right, and place the Grate bars in a nearly vertical position.

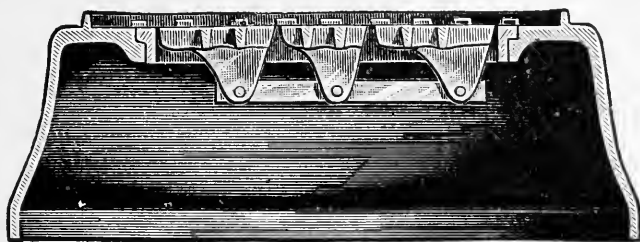


Fig. 3.

SECTION OF ASH-PIT AND GRATE.

The position of the Grate is somewhat higher than in the previous pattern, and the depth of the bars is also less, which feature gives considerably more height of ash-pit than formerly, and will be appreciated by those especially who are using the Nos. 4 and 5 sizes.

The outer circle ring of these Grates fits the base of all Heaters we have issued; and the outer bar section of all Grates we shall make are similar, but there is a slight difference in the construction of the central bars, there being two patterns, one for bases of the earlier form which had the Grate below the level of the ring, and the other for all new bases shipped after this date.

NOTE.—Customers in ordering Grates for Heaters, should invariably give the date at which the original Heater was sold, in order that the proper pattern may be sent.

Letters Patent have been applied for, and will shortly be issued, of which due notice will be given.

## LIST OF SIZES WITH DIMENSIONS AND PRICES

OF THE

## "EQUATOR" STEAM HEATERS.

Size Nos. ....	1	2	3	4	5
Diameter of heater casing, inches..	23	25	28 $\frac{1}{4}$	34	40
Diameter of base, inches.....	29 $\frac{1}{2}$	31 $\frac{1}{2}$	34 $\frac{3}{4}$	40 $\frac{1}{2}$	46 $\frac{5}{8}$
Height from bottom of base to top of shell, inches.....	63 $\frac{1}{2}$	62 $\frac{1}{2}$	64	64	67 $\frac{1}{2}$
Height of heater to top of smoke pipe elbow, inches. ....	70 $\frac{1}{2}$	71 $\frac{3}{8}$	75	77	82
Diameter of fire pot, inches.....	16 $\frac{1}{2}$	18 $\frac{1}{2}$	21 $\frac{3}{4}$	27 $\frac{1}{2}$	33 $\frac{1}{2}$
Height of water line from bottom of base, inches.....	57	57	58 $\frac{1}{2}$	58 $\frac{1}{2}$	60
Number of tubes.....	60	85	101	151	226
Diameter of steam outlets, inches..	2	2	2 $\frac{1}{2}$	3	4
Diameter of return pipes, inches..	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$
Diameter of smoke flue, inches...	5	5 $\frac{1}{2}$	8	10	12
Square feet of grate surface.....	1 $\frac{1}{2}$	2	2 $\frac{2}{3}$	4 $\frac{1}{8}$	6 $\frac{1}{8}$
Square feet of fire surface.....	63	81	97	144	200
Ratio of fire surface to grate surface	43 to 1	43 to 1	37 to 1	35 to 1	33 to 1
Number of sq. ft. of direct radiating surface it will supply....	275	375	525	825	1250
Weight of heater complete, lbs.....	1050	1200	1500	2000	2700
Price of heater complete, with trimmings .....	\$145.00	165.00	190.00	250.00	335.00

## LIST OF SIZES WITH DIMENSIONS AND PRICES

OF THE

## "GULF" STREAM HOT WATER HEATERS.

Size Nos. ....	1	2	3	4	5
Diameter of heater shell, inches....	23	25	28 $\frac{1}{4}$	34	40
Diameter of base, inches.....	29 $\frac{1}{2}$	31 $\frac{1}{2}$	34 $\frac{3}{4}$	40 $\frac{1}{2}$	46 $\frac{5}{8}$
Height from bottom of base to top of shell, inches.....	54 $\frac{3}{4}$	55 $\frac{1}{4}$	56	56 $\frac{1}{8}$	56 $\frac{1}{8}$
Height of heater to top of smoke pipe elbow, inches.....	64 $\frac{3}{8}$	65 $\frac{3}{8}$	70	72 $\frac{1}{4}$	76 $\frac{1}{2}$
Diameter of fire pot, inches....	16 $\frac{1}{2}$	18 $\frac{1}{2}$	21 $\frac{3}{4}$	27 $\frac{1}{2}$	33 $\frac{1}{2}$
Number of tubes.....	60	85	101	151	226
Number of flow pipes.....	2	3	3	3	2
Diameter of flow pipes, inches....	2	2	{ two 2 in. one 2 $\frac{1}{2}$ in. }	3	4
Number of return pipes.....	6	6	6	3	2
Diameter of return pipes, inches...	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	3	4
Diameter of smoke flue, inches....	5	5 $\frac{1}{2}$	8	10	12
Square feet of grate surface.....	1 $\frac{1}{2}$	2	2 $\frac{2}{3}$	4 $\frac{1}{8}$	6 $\frac{1}{8}$
Square feet of fire surface.....	62 $\frac{1}{2}$	80	96	142	195 $\frac{1}{4}$
Ratio of fire surface to grate surface..	42 to 1	43 to 1	36 to 1	35 to 1	32 to 1
Square feet of radiating surface it will supply.....	450	600	800	1250	1850
Weight of heater complete, lbs.....	950	1150	1350	1750	2350
Price of heater complete, without trimmings .....	\$115.00	130.00	155.00	215.00	285.00

*Each pipe measures one square foot of surface.  
Square feet of heating surface in all these Radiators can be increased or diminished  
by varying the length of the tubes.*

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## NASON'S VERTICAL WROUGHT IRON WELDED TUBE RADIATORS.

The Nason Radiators have been so long and so favorably known as to render any very full description of their construction unnecessary, but certain improvements which have been recently adopted in their form and manufacture will prove interesting to the trade.

While retaining the original pattern of base and top for use where a heavy and massive appearance is desired, the general demand for a radiator combining elegance of form with strength, induced us to undertake the large labor and expense of making an entire new set of patterns, which design has to-day nearly supplanted the previous form. This pattern we have named NASON'S IMPROVED, and radiators should be ordered under this name unless the old pattern is desired.

The most marked improvement is the form of the base, the latter being so constructed as to admit air through apertures between each of the pipes. These holes are circular, and made slightly conical in form, so that each is in fact a small blow-pipe which directs a current of cold air, taken from the floor, where it is coldest, directly upon the adjacent pipes, and this enormously increases their activity in heating the air. By this device the inner rows of pipes are rendered almost as active as those on the exterior, and less heating surface than has been commonly used in the past can be employed in a room of given size.

There will also be found a considerable number of intermediate sizes not found in earlier editions of our catalogue, which have been made in compliance with the often expressed wish of customers, to fill the gap between certain sizes—notably those between 48 and 60 pipes and 24 and 32.

Also, there are several new smaller sizes here presented for the first time, especially adapted to small rooms in apartment houses, so that the exact proportion of surface to volume can be given, instead of putting in an excess or deficiency of surface, as has often been found necessary.

There are also included two patterns specially made to condense a large amount of heating surface into a small space, where but little of the latter is available and the floor area restricted.

By means of our recently patented welding process for closing the tops of tubes, a uniformity in their length and appearance is secured which is highly desirable; also absolute freedom from leakage is obtained. The process being done by machinery, all welds are subjected to precisely the same pressure.

All radiators are tested under a pressure of 70 pounds boiler pressure, insuring to a certainty that no leaks will occur when less than this is used. If a higher pressure is to be used it should be specifically so stated in the order, so that such radiators may be specially tested and the requirements met.

*Each pipe measures one square foot of surface.  
Square feet of heating surface in all these Radiators can be increased or diminished  
by varying the length of the tubes.*

All tubes in our radiators being cut to a standard thread, they may be readily removed from a base, when the latter is connected in the building, without breaking its connection, if it is desired at any time to increase or diminish the heating surface by lengthening or shortening the tubes.

This feature is possessed by none of the return bend pattern.

As manufactured in our radiators the form of material is less than half the thickness of the cast iron loops or tubes commonly used, and it is apparent to any one that the thinner the material, or, in other words, the closer the air can be brought within direct contact of the interior steam heated surface of a radiator, the more rapidly the heat will be transmitted from the steam to the air.

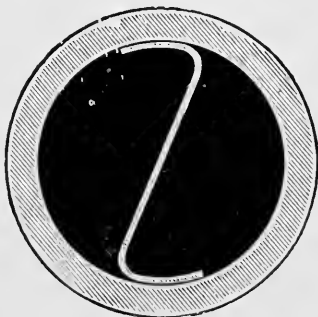
It is well known, too, that sand is an excellent non-conductor—it being frequently used for insulating purposes, and the impossibility of properly cleaning the interior of cast iron radiators from sand which is left by the cores and burned into the casting, makes this coating on the inside a serious obstructor of heat passing through it.

Attention is respectfully called to the carefully made series of experiments recently conducted by the well-known engineer and expert, Mr. George M. Barrus, of Boston, for the purpose of ascertaining the relative heating efficiency of our Improved Radiator as compared with cast-iron surface, an abstract of which will be found on pages 161–61½

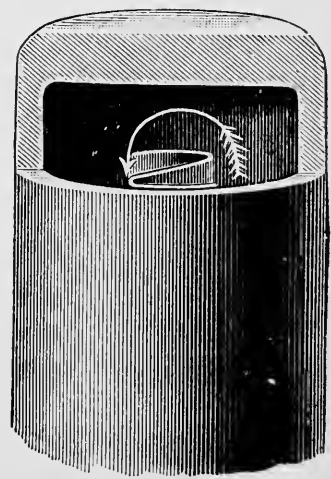
The extraordinary efficiency shown by Mr. Barrus's experiments is due in a large measure to the fact that the radiating surface is composed chiefly of wrought iron instead of cast.

### THEORY OF CIRCULATION.

Although the question of the active circulation of steam in the Nason Tube was settled years since, both by theory and results in practice, derived from the millions of square feet of surface sold by us, it is occasionally raised by parties not familiar with, or who have been misled by interested competitors, and for their benefit cuts Nos. 1 and 2 are here included.



NO. 1.



NO. 2.

No. 1 shows horizontal section of a standard tube, with the form of diaphragm and its method of insertion. It will be observed that it fits the tube closely, thus dividing

*Each pipe measures one square foot of surface.*

*Square feet of heating surface in all these Radiators can be increased or diminished by varying the length of the tubes.*

the latter into two parts as efficiently as if there were two tubes connected at the top by means of a return bend.

In cut No. 2 it will be noticed that the diaphragm is driven nearly to the end of the tube—a space however being left sufficient to permit of the easy passage of air or steam over it.

The theory of circulation is as follows:

One hundred cubic feet of air at 60 degrees weigh 7.6 lbs. One hundred cubic feet of steam at 212 degrees weigh 3.6 lbs., from which it is evident that steam is nearly 53 per cent. lighter than air.

Each tube when screwed into a base thus stands in the relation of an inverted siphon to it, and on the admission of steam into the latter, it is obvious that air being so much the heavier, it will immediately drop down on one side of a diaphragm—no matter which—and its place occupied by steam which rises on the opposite side, thus following the air and supplanting it.

The heavier air falling in the base is immediately ejected through the return pipe, so that an interval of a few seconds thus suffices to entirely fill the radiator with steam

## DURABILITY OF DIAPHRAGMS.

It may be of interest to customers who have been informed that the diaphragms inserted by us are perishable and will rust out after a few years' use, to know that some of the first radiators which we made, about twenty-five years since, were placed in the Fifth Avenue Hotel of this city; and after a continuous use for the above period, we recently, by the kind permission of the proprietors, Messrs. Hitchcock & Darling, removed several of the diaphragms, which are now in our office and open for inspection, together with many others of about equal age, which are equally as perfect. The original scale of metal on them has been little attacked; and the diaphragms of this age are usually quite as good as the many samples we have.

Steam in itself is a perfect protector of iron, and the vertical position in which the diaphragms are placed drains from them immediately all water which is deposited on them.

Upon the entrance of air, from leakage or otherwise, after the steam is turned off, there is no water present to rust the surface.

These facts are borne out by the many samples in our possession.

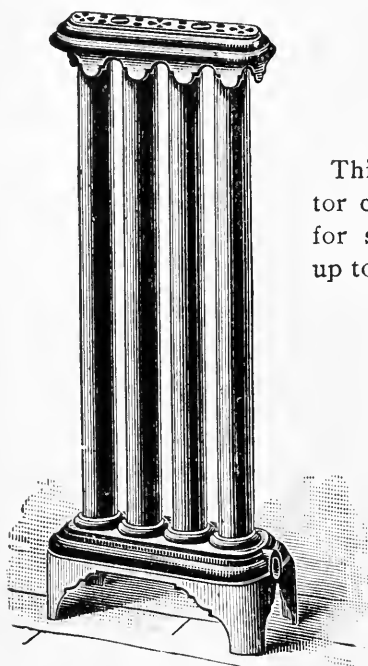
*In an experience covering twenty-nine years (Radiators with Diaphragms inserted in the tubes having been made by us in 1860), we have never learned of an instance in which diaphragms have rusted out, or tubes to be refitted with them in consequence of their destruction.*

*Each pipe measures one square foot of surface.*

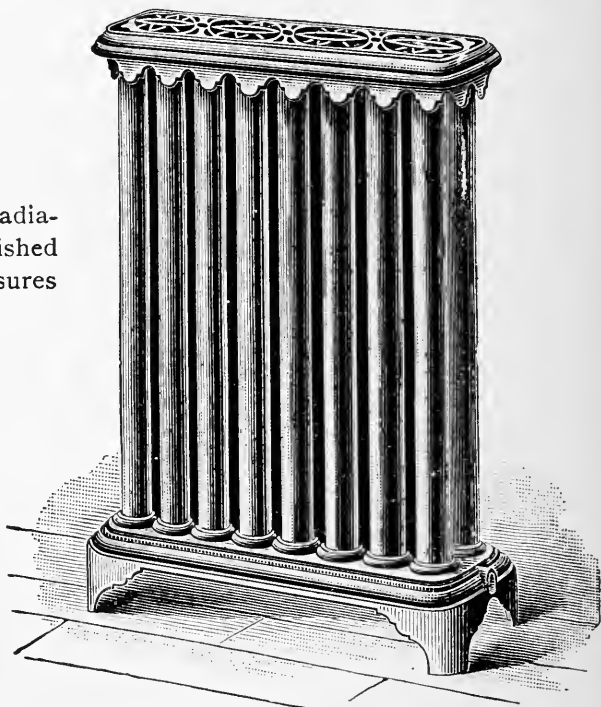
*Square feet of heating surface in all these Radiators, can be increased or diminished by varying the length of the tubes.*

From the large number of sizes made, a few illustrations only are selected, which serve sufficiently to show their general style and appearance.

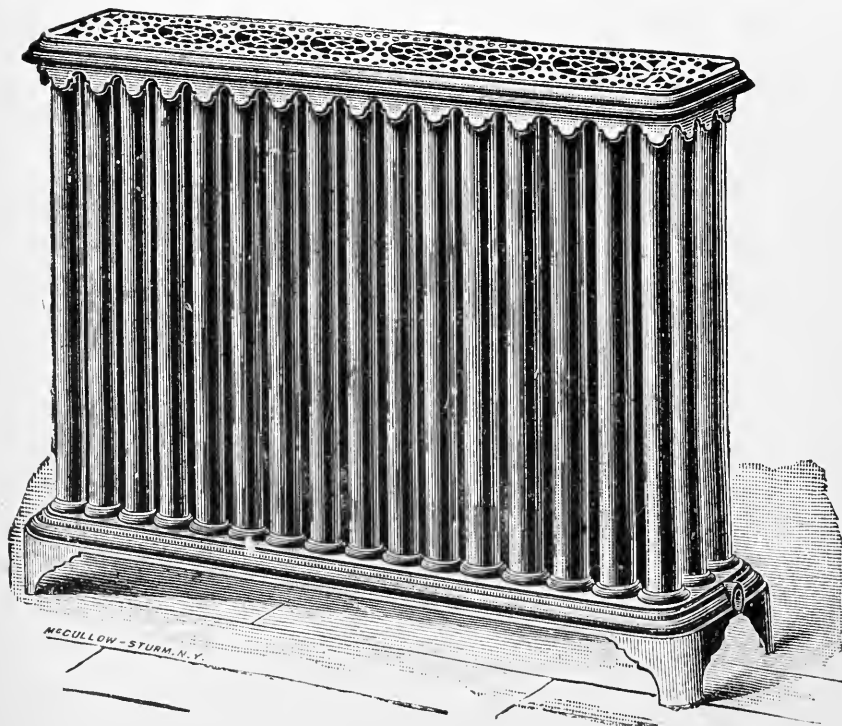
The following show our Nason Improved Pattern as made in four different widths.



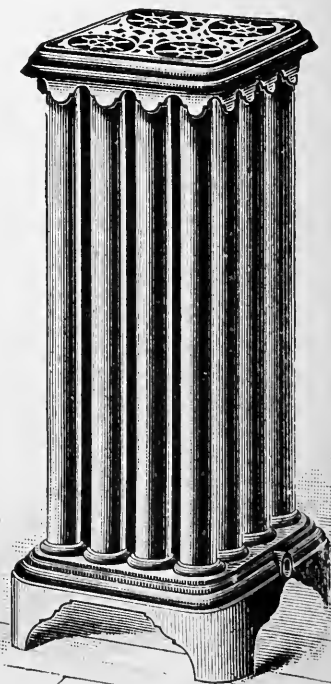
Single Row Radiator.



Two Row Radiator.



Three Row Radiator.



Four Row Radiator.

In ordering specify "Improved" Pattern.

*Each pipe measures one square foot of surface.*

*Square feet of heating surface in all these Radiators can be increased or diminished by varying the length of the tubes.*

The annexed price-lists include only what are known as regular sizes, which are usually kept on hand, or if not on hand, can be promptly furnished. The prices include open-work Iron Tops. Binders for marble tops will be furnished when ordered, but as the use of the latter is attended with considerable loss of efficiency, they are not recommended except in special cases.

## NASON'S "IMPROVED" VERTICAL TUBE RADIATORS.

PATTERN NO. 1. SINGLE ROW OF TUBES. Outside width at floor,  $5\frac{1}{2}$  in.; usual height, 35 in.

Size of steam openings,	{ Inlets under 30 tubes, $\frac{3}{4}$ in. ; over 30 tubes, 1 in. Outlets, " 30 " $\frac{3}{4}$ " " 30 " $\frac{3}{4}$ "							
Distances from centre of openings to the floor : Inlets, 4 in. ; Outlets, $3\frac{3}{4}$ in.								
Number of Tubes in length.....	4	6	8	10	12	16	20	24
Total Number of Tubes.....	4	6	8	10	12	16	20	24
Square Ft. of Heating Surface.....	4	6	8	10	12	16	20	24
Outside length of Radiator, inches.....	$11\frac{1}{4}$	$15\frac{1}{4}$	$19\frac{1}{4}$	$23\frac{1}{4}$	$27\frac{1}{4}$	$35\frac{1}{4}$	$43\frac{1}{4}$	$51\frac{1}{4}$
Price, Plain. ....	\$2.50	3.75	4.50	5.00	6.15	8.00	10.00	12.00
"   Bronzed.....	\$3.00	4.50	5.50	6.00	7.50	9.50	12.00	14.00

PATTERN NO. 2. TWO ROWS OF TUBES. Outside width at floor,  $7\frac{1}{2}$  in.; usual height, 35 in.

Size of steam openings,	{ Inlets, under 30 tubes, $\frac{3}{4}$ in.; over 30 tubes, 1 in. Outlets, " 30 " $\frac{3}{4}$ " " 30 " $\frac{3}{4}$ "									
Distances from centre of openings to the floor: Inlets, 4 in.; Outlets, $3\frac{3}{4}$ in.										
Number of Tubes in length ....	4	6	8	10	12	14	16	20	24	28
Total Number of Tubes.....	8	12	16	20	24	28	32	40	48	56
Square Ft. of Heating Surface..	8	12	16	20	24	28	32	40	48	56
Outside length of Radiator, ins..	$11\frac{1}{4}$	$15\frac{1}{4}$	$19\frac{1}{4}$	$23\frac{1}{4}$	$27\frac{1}{4}$	$31\frac{1}{4}$	$35\frac{1}{4}$	$43\frac{1}{4}$	$51\frac{1}{4}$	$59\frac{1}{4}$
Price, Plain.....	\$4.25	6.50	7.50	9.00	11.00	13.00	15.00	18.00	21.00	23.50
" Bronzed.....	\$5.00	8.00	9.00	10.50	13.00	15.00	18.00	22.00	25.00	29.50

PATTERN NO. 3. THREE ROWS OF TUBES. Outside width at floor,  $9\frac{1}{2}$  in.; usual height, 35 in.

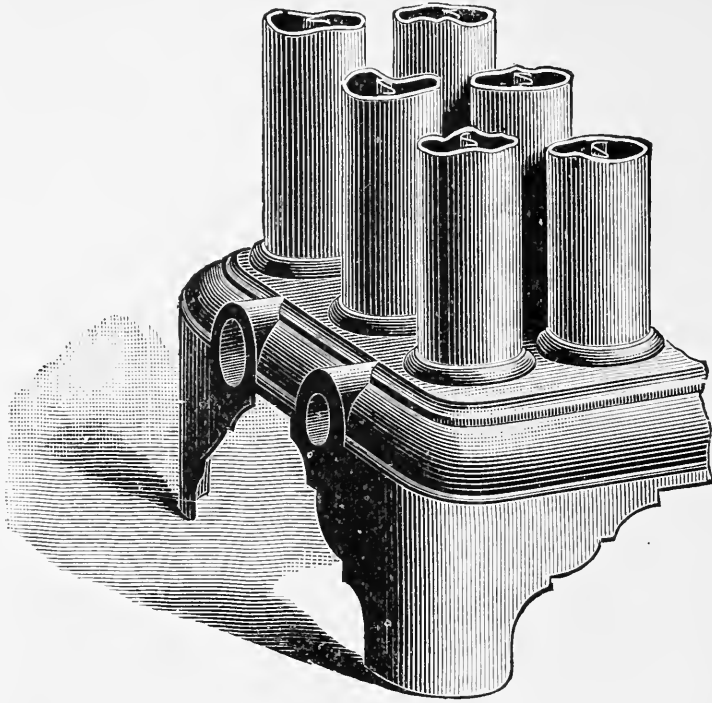
Size of steam op'ngs,	{	Inlets, under 30 tubes, $\frac{3}{4}$ in.; 30 to 60 tubes, 1 in.; 60 tubes and over, $1\frac{1}{4}$ in.									
		Outlets, " 30 " $\frac{3}{4}$ " 30 to 60 " $\frac{3}{4}$ " 60 " " 1 "									
Distances from centre of openings to the floor: Inlets, 4 in.; Outlets, $3\frac{3}{4}$ in.											
Number of Tubes in length	4	6	8	10	12	14	16	18	20	24	28
Total Number of Tubes.	12	18	24	30	36	42	48	54	60	72	84
Sq. Ft. of Heating Surface	12	18	24	30	36	42	48	54	60	72	84
O'sidel'th of Radiator, ins	$11\frac{1}{4}$	$15\frac{1}{4}$	$19\frac{1}{4}$	$23\frac{1}{4}$	$27\frac{1}{4}$	$31\frac{1}{4}$	$35\frac{1}{4}$	$39\frac{1}{4}$	$43\frac{1}{4}$	$51\frac{1}{4}$	$59\frac{1}{4}$
Price, Plain.....	\$6.00	9.00	11.00	13.50	16.00	19.00	21.00	24.00	26.00	31.00	36.00
" Bronzed.....	\$7.00	10.50	12.50	16.00	18.50	22.00	24.00	27.00	30.00	36.00	42.00

PATTERN NO. 4. FOUR ROWS OF TUBES. Outside width at floor  $11\frac{1}{4}$  in.; usual height, 35 in.

Size of steam op'ngs,	{ Inlets, under 30 tubes, $\frac{3}{4}$ in.; 30 to 60 tubes, 1 in ; 60 tubes and over, $1\frac{1}{4}$ in.								
	{ Outlet, " 30 " $\frac{3}{4}$ " 30 to 60 " $\frac{3}{4}$ " 60 " " 1 " "								
Distances from centre of openings to floor : Inlets, 4 in.; Outlets, $3\frac{3}{4}$ in.									
Number of Tubes in length.....	4	8	10	12	16	20	24	28	32
Total Number of Tubes .....	16	32	40	48	64	80	96	112	128
Square Ft. of Heating Surface.....	16	32	40	48	64	80	96	112	128
Outside length of Radiator, inches.....	$11\frac{1}{4}$	$19\frac{1}{4}$	$23\frac{1}{4}$	$27\frac{1}{4}$	$35\frac{1}{4}$	$43\frac{1}{4}$	$51\frac{1}{4}$	$59\frac{1}{4}$	$67\frac{1}{4}$
Price, Plain.....	\$7.50	13.50	17.00	20.50	26.50	33.00	39.00	45.00	52.50
" Bronzed.....	\$8.50	16.00	20.00	24.00	31.00	38.50	46.00	53.50	62.00

PLEASE NOTE change in size of Radiator Connections, which are different from those previously issued by us. When desired they can be tapped to any required size or with extra large openings on the returns where they are to be connected to an apparatus constructed on the one-pipe system.





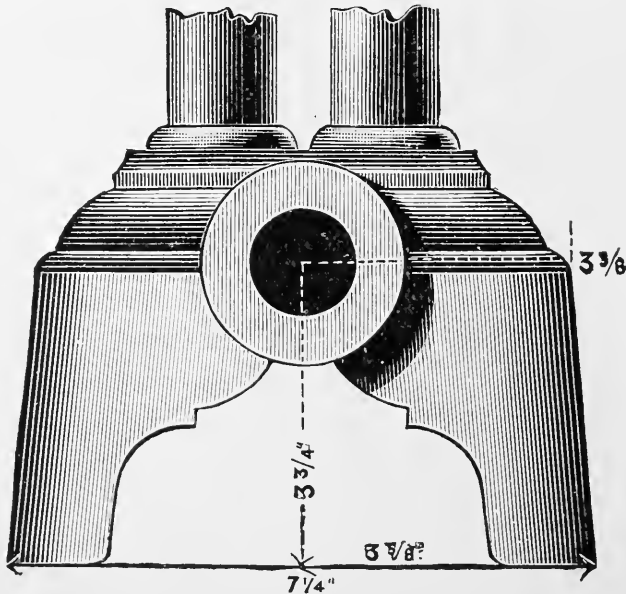
Cut showing both outlets on one end.

When necessary they are furnished as above shown with both steam and return on the same end. A positive circulation being established in this way through the base by means of a vertical diaphragm cast in the latter.

This form of construction facilitates connection to the risers and returns of an apparatus, and reduces its expense, as the main pipes are commonly placed side by side in large buildings.

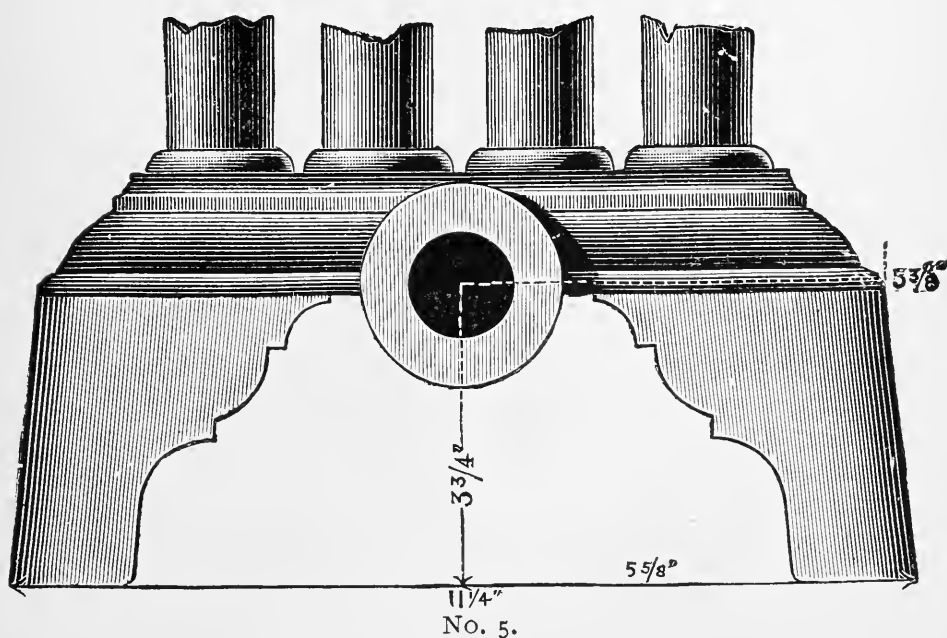
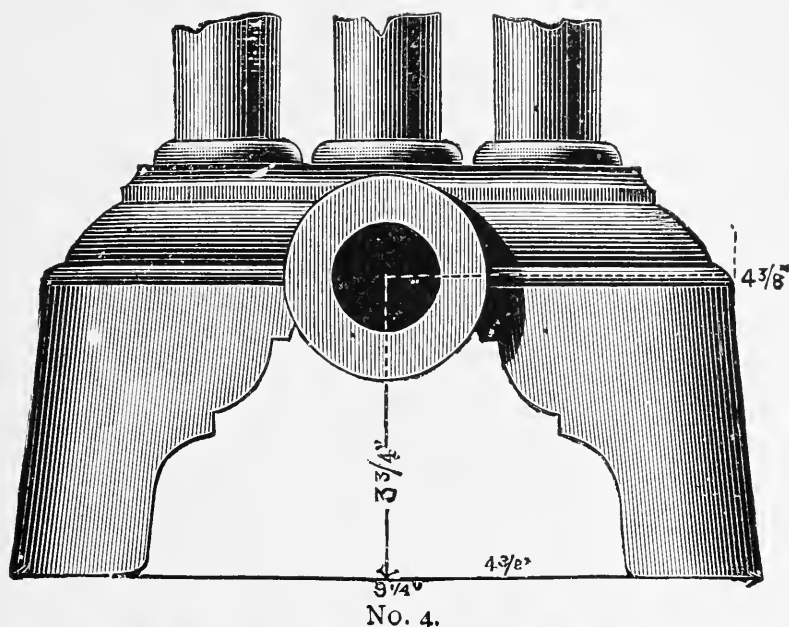
When inlet and outlet are both on one end, their distances apart from centre to centre are for 2 pipes wide pattern 3 in.; 3 pipes wide pattern 4 in.; 4 pipes wide pattern 4 in.

Both holes are at the same height above the floor, or  $3\frac{3}{4}$  in.



NO. 3.

*Each pipe measures one square foot of surface.  
Square feet of heating surface in all these Radiators can be increased or diminished  
by varying the length of the tubes.*



For the benefit of steam fitters cuts Nos. 3, 4 and 5 are here introduced, to enable them to lay out connections to the mains ready to receive the radiators. Scale is one-quarter full size, and figures indicate distances from floor to centre of inlet pipes.

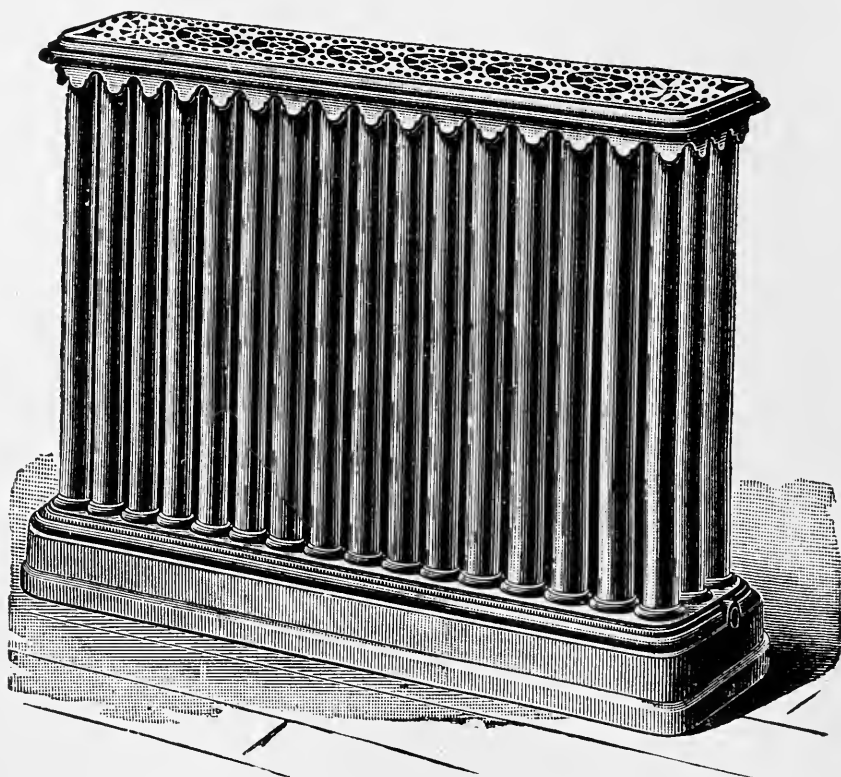
Where both openings are placed at one end of a base the distances are the same as above given.

Openings for either inlets or outlets can be made of varying sizes when so ordered, to suit the requirements of the trade, without extra charge.

**NOTE.**—All dimensions given are for return ends, inlets being  $\frac{1}{4}$  inch higher.

*Each pipe measures one square foot of surface.*

*Square feet of heating surface in all these Radiators can be increased or diminished by varying the length of the tubes.*



No. 6.

Cut No. 8 represents our latest pattern of Box Base to be used for the Direct-Indirect System now becoming deservedly popular. It is in use in many well-known public buildings, notably in a number of the public schools in this city, where large numbers are in operation.

No. 7 is the same radiator provided with an air inlet on the base for admitting air directly from the room when for any reason, as, for instance, it is desired to heat a room quickly, the outside supply is shut off, and immediately transforms the radiator into the regular pattern.

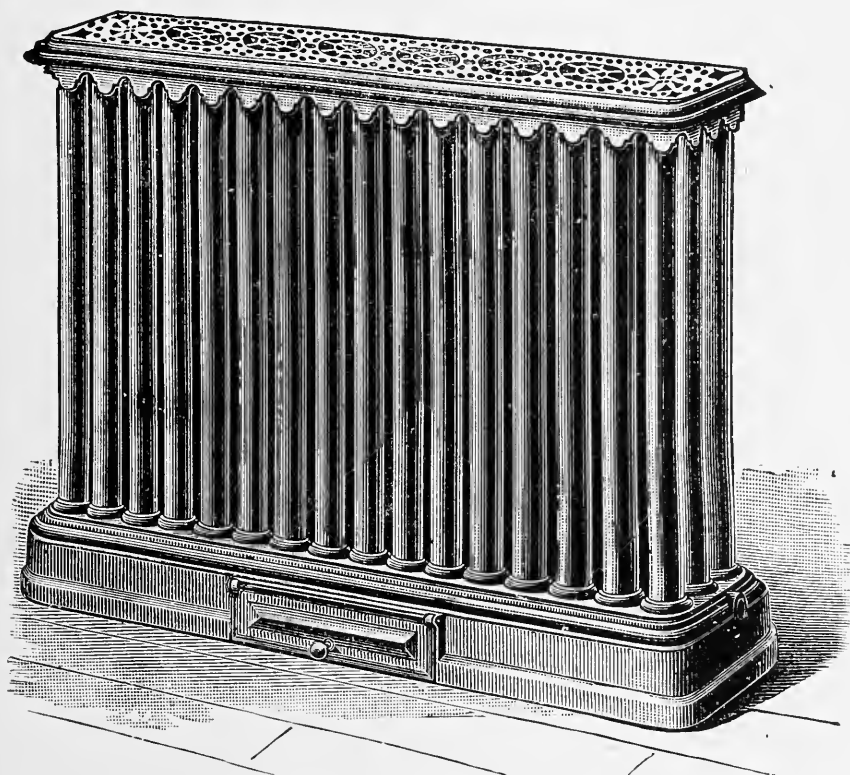
This pattern is furnished with an outlet in the back of the base casting, which will be made of any dimensions desired, or air may be taken in at the bottom through the floor.

This form of base affords the best possible method of admitting air to rooms on the direct-indirect system, which is becoming deservedly popular, as owing to the large number of openings equally distributed in the base, no air can enter without coming immediately in contact with every part of the heating surface, thus becoming at once and thoroughly warmed. Each tube thus does its full share of work, and contributes greatly to the heating efficiency of the radiator.

The dimensions, &c., are identical with those of our new pattern as described on page 6 except that the distances from center of the outlets to the floor are: Inlets,  $4\frac{1}{8}$  inches; outlets,  $4\frac{7}{8}$  inches.

*Each pipe measures one square foot of surface.*

*Square feet of heating surface in all these Radiators can be increased or diminished by varying the length of the tubes.*



No. 7

## LIST OF STANDARD SIZES AND PRICES OF DIRECT-INDIRECT OR BOX BASE RADIATORS.

PATTERN NO. 1 WITH SINGLE ROW OF TUBES IS NOT FURNISHED IN BOX  
BASE PATTERN.

### PATTERN NO. 2. DOUBLE ROW OF TUBES.

No. of Tubes in length.....	4	6	8	10	12	14	16	20	24	28
Total No. of Tubes.....	8	12	16	20	24	28	32	40	48	56
Price for Plain.....	4.50	6.75	8.00	10.00	11.75	13.75	16.00	20.00	23.50	27.50
Price for Bronzed.....	5.25	8.00	9.50	12.00	13.75	16.00	19.00	24.00	27.50	32.00

### PATTERN NO. 3. THREE ROWS OF TUBES.

No. of Tubes in length	4	6	8	10	12	14	16	18	20	24	28
Total No. of Tubes...	12	18	24	30	36	42	48	54	60	72	84
Price for Plain.....	6.40	9.75	11.80	14.75	17.25	20.25	21.50	23.75	29.50	34.75	40.50
Price for Bronzed....	7.40	11.25	13.25	16.50	19.75	22.75	25.50	28.75	33.00	39.25	46.00

### PATTERN NO 4. FOUR ROWS OF TUBES.

No. of Tubes in length.....	4	8	10	12	16	20	24	28	32
Total No. of Tubes.....	16	32	40	48	64	80	96	112	128
Price for Plain .....	8.00	14.50	18.25	25.00	28.50	37.00	43.50	51.00	58.00
Price for Bronzed....	9.00	16.00	20.00	27.50	33.50	42.50	50.00	58.00	68.00

In ordering please state explicitly whether Bases are to have doors on the front, openings on the back or both.

*Price for Door fitted to each Base, \$1.75.*

*Each pipe measures one square foot of space.*

*Square feet of heating surface in all these Radiators can be increased or diminished by varying the length of the tubes.*

## BOX BASE RADIATORS.—*Continued.*

The openings into which Doors can be fitted in front side of Box Base Radiators are  $6 \times 3\frac{3}{4}$ ,  $8 \times 3\frac{3}{4}$ ,  $10 \times 3\frac{3}{4}$  inches.

The following measurements are the dimensions of the openings in the back side of Box Base Radiators.

2x4 $3\frac{1}{2} \times 6$	2x6 $3\frac{1}{2} \times 8$	2x8 $3\frac{1}{2} \times 8$	2x10 $3\frac{1}{2} \times 8$	2x12 $3\frac{1}{2} \times 8$	2x14 $3\frac{1}{2} \times 8$	2x16 $3\frac{1}{2} \times 8$	2x20 $3\frac{1}{2} \times 8$	2x24 $3\frac{1}{2} \times 8$
2x28 $3\frac{1}{2} \times 8$	3x4 $3\frac{1}{2} \times 6$	3x6 $3\frac{1}{2} \times 8$	3x8 $3\frac{1}{2} \times 8$	3x10 $3\frac{1}{2} \times 8$	3x12 $3\frac{1}{2} \times 8$	3x14 $3\frac{1}{2} \times 8$	3x16 $3\frac{1}{2} \times 8$	3x18 $3\frac{1}{2} \times 8$
3x20 $3\frac{1}{2} \times 8$	3x24 $3\frac{1}{2} \times 8$	3x28 $3\frac{1}{2} \times 12$	4x4 $3\frac{1}{2} \times 6$	4x8 $3\frac{1}{2} \times 8$	4x10 $3\frac{1}{2} \times 8$	4x12 $3\frac{1}{2} \times 8$	4x16 $3\frac{1}{2} \times 8$	4x20 $3\frac{1}{2} \times 12$
			4x24 $3\frac{1}{2} \times 12$	4x28 $3\frac{1}{2} \times 16$	4x32 $3\frac{1}{2} \times 16$			

Unless otherwise ordered, our box bases will be sent without opening either in the front or back—the air supply being commonly through an opening in the floor, as this method of connection avoids the necessity of making a joint with a tin air box at the back.

When doors at the front are wanted it should be specifically stated.

Dampers controlling the air supply are not furnished, owing to the varying methods in which air is introduced, and the forms of air inlets from the flues to be adopted.

They may be of the swinging type, like an ordinary stove damper, or when more convenient, of a sliding grate pattern.

Up to and including sizes 16 tubes in length, the boxes are cast with the bases in one piece. The longer patterns have cast iron boxes fitted on to which the base casting is readily set and attached with screws.

## THE DIRECT-INDIRECT SYSTEM.

The good results predicted for this method of heating during the last few seasons have been so entirely satisfactory as to more than come up to our anticipations.

By this method, as is generally understood, the space beneath the base of radiators is enclosed, and air from the exterior supplied to it by means of air boxes in the cellar, or in some cases directly through the wall from the outside. Air then passes up through holes in the base and between the pipes, where it is thoroughly warmed before entering the room.

Our particular form of radiator is the most perfect which has yet been devised for this method of heating, because of the numerous inlets through which the air passes, thus sub-dividing it and bringing the current against every portion of the inside rows, as well as the exterior tubes.

The form of the orifices being circular, each acts as a small blow-pipe directly against the tubes, thereby greatly increasing their steam condensing effect, which necessarily means that correspondingly large volumes of air are warmed.

By this system the whole surface of the radiator is actively in operation, instead of the inside pipes being, as is common with most radiators, immersed in a warm air bath, where they are comparatively inoperative. Thus, owing to the great activity of the surface a considerably lesser number of square feet of surface can be placed in each room with a certainty of warming it than is ordinarily used.

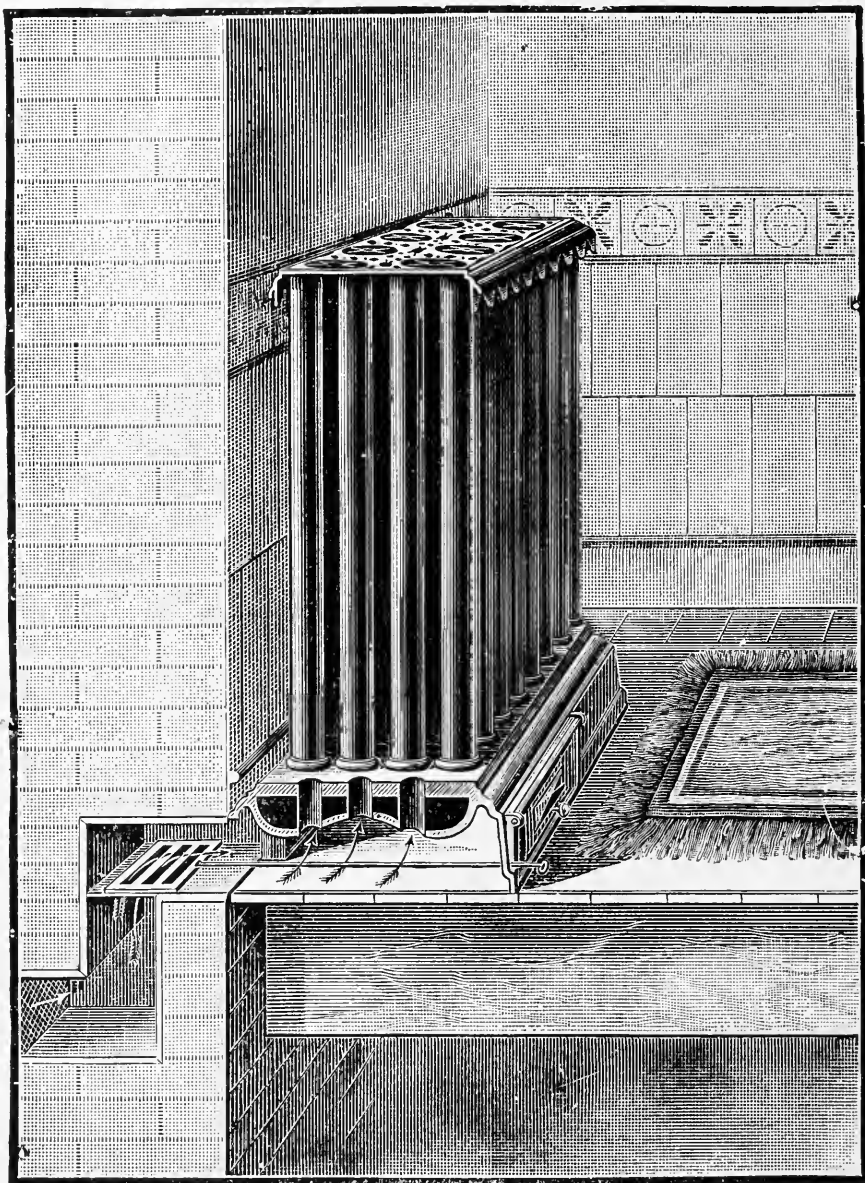
In very cold or windy weather, when it is not desirable to take air from the exterior, the outside damper is then closed, and the door in the front of the base, by being opened, immediately places the radiator under the same conditions that a radiator of the standard type is working under.

These conditions are: That the cold air from the floor enters the door in the base, passes through the air openings over the tubes, and it is then distributed throughout the room.

This system is to be commended as possessing at once all the advantages of both systems, having the desirable quality of giving radiant heat in a room, besides warming air with which the surface comes in contact, and also giving more or less ventilation, the latter being controlled directly in rooms where it is wanted as readily as where registers are used.

*Each pipe measures one square foot of surface.*

*Square feet of heating surface in all these Radiators can be increased or diminished by varying the length of the tubes.*

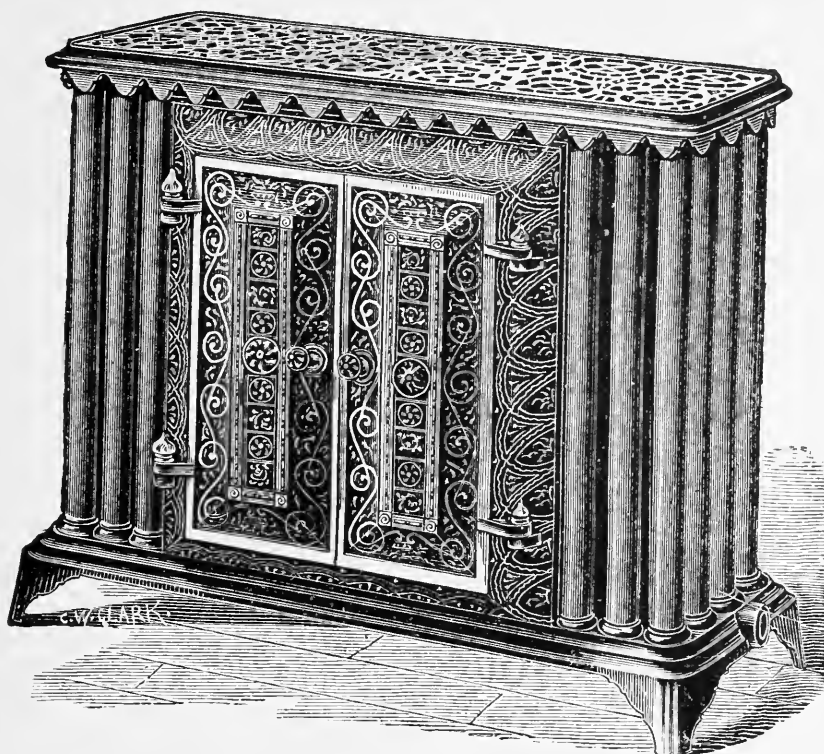


NO. 8.

No. 8 illustrates a convenient method of connecting our box base pattern with the indirect cold air flue. It will be noticed that air can be taken from the exterior of the building or entirely cut off and air circulation established from the room by opening the door in front of the base,

Air may be admitted either at the side of a building or through a flue running to a cellar; but it is not desirable to take air in through a vertical flue running to any point above the radiator, as an inverted current may be established on a windy day where radiators are run on the leeward side of the building, and the heated air be thus drawn from the room.





## THE NASON HOT CLOSET OR DINING-ROOM RADIATOR.

Special attention is invited to our new DINING-ROOM HOT CLOSET RADIATOR, of which we have now on hand a full stock of different sizes, ready for immediate delivery.

This form of heater is placed on the market with a view to meeting the constant and increasing demand for a Dining-Room Radiator that, while handsome in appearance, will be reasonable in price.

As shown in the accompanying cut, it will be seen that it has the advantage over several other patterns now offered by being enclosed on three sides by heating surface. Each closet is furnished with three perforated shelves which are readily adjusted to any height desired by means of side racks cast for this purpose.

For this Radiator the patterns have been made with great care from Bronze, for the purpose of obtaining castings as smooth and perfect as possible. The general appearance of the heater, as will be seen from the cut, is neat and ornamental, and when finished in Gold or Silver Bronze it becomes a handsome piece of furniture in any room.

The projection of the doors in front allows the introduction of dishes to be warmed of a width up to  $13\frac{1}{2}$  inches. Patterns permit the extension of the length of the Radiator irrespective of the size of the closet, in order to adapt its heating surface to the dimensions of the room in which it may be placed.

This Radiator is made only in our four-row-wide pattern, and the internal dimensions of the closet in any pattern are:  $13\frac{1}{2}$  inches in width, by 19 inches long, by 29 inches in height.

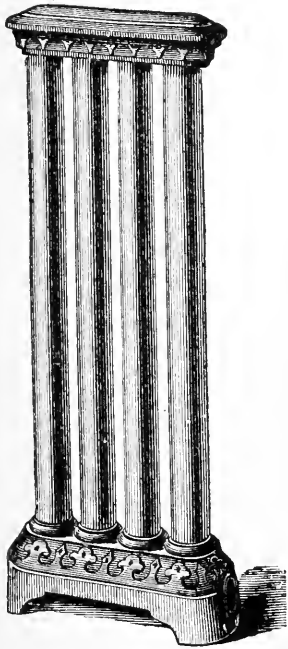
On application a Photograph will be sent by mail.

Following we give the list of sizes in which the Hot Closets are made, with list prices, and the square feet of heating surface in each.

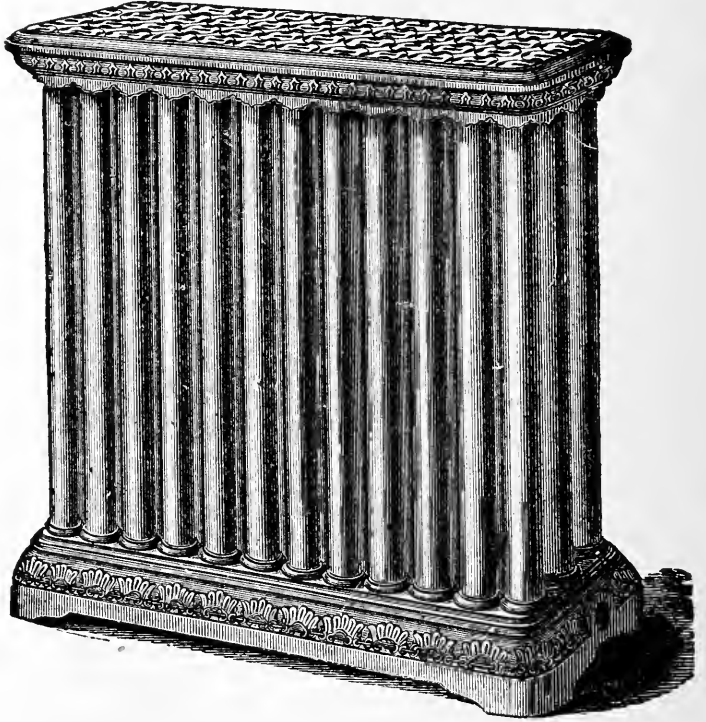
Pattern.....	4x16	4x20	4x24	4x28	4x32
Heating surface in square ft....	30	46	62	78	94
List Prices, Plain.....	\$33.00	\$40.00	\$47.00	\$54.00	\$61.00
Bronzed, in Gold or Silver.....	38.50	47.00	55.50	64.00	71.00

*Each pipe measures one square foot of surface.*

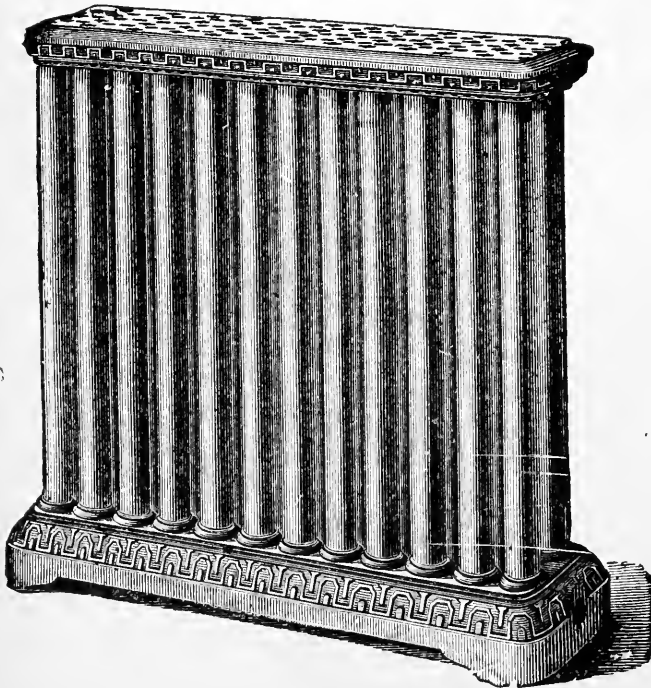
*Square feet of heating surface in all these Radiators can be increased or diminished by varying the length of the tubes.*



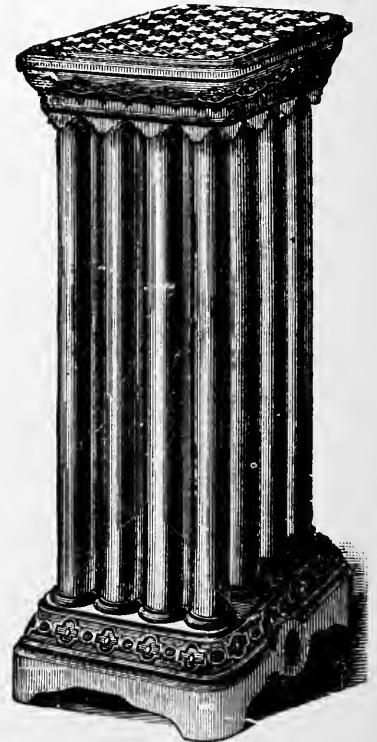
Single Row Radiator.



Three Row Radiator.



Two Row Radiator.



Four Row Radiator.

This pattern is for Low Pressure to 40 lbs.  
In ordering specify "Solid Base" Pattern.

*Each pipe measures one square foot of surface.*

*Square feet of heating surface in all these Radiators can be increased or diminished by varying the length of the tubes.*

## NASON'S "SOLID BASE" PATTERN VERTICAL WROUGHT IRON WELDED TUBE RADIATORS.

These are similar in construction to the new pattern described on the previous pages, except that they are heavier and more substantial in appearance, also more elaborate in design.

In handsomely furnished dwelling houses they are frequently used where a radiator of extra finish is desired.

As in the case of the new pattern, each tube is guaranteed to equal one square foot of surface.

PATTERN NO. 1, SINGLE ROW OF TUBES		Outside width, $4\frac{1}{2}$ inches ; usual height, 3 feet.						
Sizes of steam openings—Inlets, $\frac{3}{4}$ inch.		Outlets, 1 inch.						
Distances from centre of openings to the floor.—Inlets, 3 inches.		Outlets, $2\frac{1}{2}$ inches.						
Number of tubes in length.....	4	6	8	10	12	16	20	24
Total number of tubes.....	4	6	8	10	12	16	20	24
Outside length of radiator, inches....	$10\frac{3}{4}$	$14\frac{3}{4}$	$18\frac{3}{4}$	$22\frac{3}{4}$	$26\frac{3}{4}$	$34\frac{3}{4}$	$42\frac{3}{4}$	$50\frac{3}{4}$
Square feet of heating surface.....	4	6	8	10	12	16	20	24
Price, plain.....	3.25	4.50	5.25	6.50	7.25	9.25	11.00	13.50
Price, bronzed.....	3.75	5.00	6.00	7.25	8.25	10.50	12.50	15.00

PATTERN NO. 2, DOUBLE ROW OF TUBES.		Outside width, $7\frac{1}{4}$ inches ; usual height, 3 feet.						
Sizes of steam openings.—Inlets, 1 inch.		Outlets, $1\frac{1}{4}$ inches.						
Distances from centre of openings to the floor.—Inlets, 4 inches.		Outlets, $3\frac{1}{8}$ inches.						
Number of tubes in length.....	4	6	8	10	12	16	20	24
Total number of tubes.....	8	12	16	20	24	32	40	48
Outside length of radiator, inches....	$10\frac{3}{4}$	$14\frac{3}{4}$	$18\frac{3}{4}$	$22\frac{3}{4}$	$26\frac{3}{4}$	$34\frac{3}{4}$	$42\frac{3}{4}$	$50\frac{3}{4}$
Square feet of heating surface.....	8	12	16	20	24	32	40	48
Price, plain.....	5.25	8.00	9.20	10.75	13.15	17.00	20.50	25.00
Price, bronzed.....	6.00	9.00	10.50	12.50	15.00	19.50	23.50	28.50

PATTERN NO. 3, THREE ROWS OF TUBES.		Outside width, $9\frac{1}{2}$ inches ; usual height, 3 feet.						
Sizes of steam openings—Inlets, 1 inch.		Outlets, $1\frac{1}{4}$ inches.						
Distances from centre openings to the floor.—Inlets, $4\frac{1}{2}$ inches.		Outlets, $3\frac{1}{2}$ inches.						
Number of tubes in length.....	4	8	12	16	20	24	28	
Total number of tubes.....	12	24	36	48	60	72	84	
Outside length of radiator, inches.....	$11\frac{1}{2}$	$19\frac{1}{2}$	$27\frac{1}{2}$	$35\frac{1}{2}$	$43\frac{1}{2}$	$51\frac{1}{2}$	$59\frac{1}{2}$	
Square feet of heating surface.....	12	24	36	48	60	72	84	
Price, plain.....	7.75	13.50	19.25	25.00	32.00	37.50	42.50	
Price, bronzed.....	8.75	15.50	22.00	28.50	36.50	42.50	48.50	

PATTERN NO. 4, FOUR ROWS OF TUBES.		Outside width, 12 inches ; usual height, 3 feet.						
Sizes of steam openings—Inlets, 1 inch.		Outlets, $1\frac{1}{4}$ inch.						
Distances from centre of openings to the floor.—Inlets, $4\frac{3}{4}$ inches.		Outlets, $3\frac{1}{8}$ inches.						
Number of tubes in length.....	4	8	12	16	20	24	28	32
Total number of tubes.....	16	32	48	64	80	96	112	128
Outside length of radiator, inches....	12	20	28	36	44	52	60	68
Square feet of heating surface.....	16	32	48	64	80	96	112	128
Price, plain.....	10.50	18.25	27.00	34.50	43.00	50.50	57.50	65.00
Price, bronzed.....	12.00	21.00	31.00	40.00	50.00	58.00	65.00	74.00

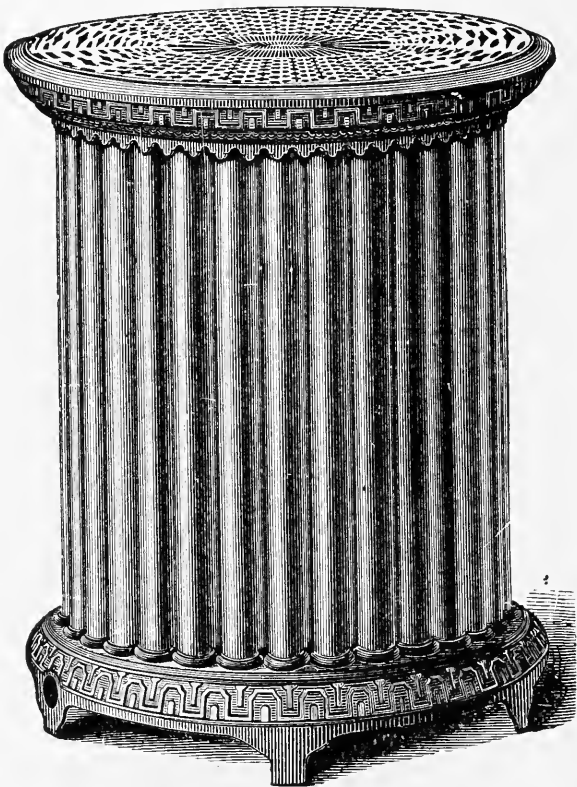
The inlets and outlets, if not wanted as above named, will be made as desired.

It will be noticed that the Outlets to Radiators in the foregoing tables are larger than the Inlets. They are made thus because when intended for single pipe connection the Outlets, being the lower, they can be tapped larger for the purpose of admitting steam and taking the water of condensation through the same pipe. *When otherwise intended, both Inlets and Outlets will be tapped as ordered.*

These Radiators are considerably more efficient than those made of cast iron. This must be so, since *wrought iron is the best surface in use for steam warming radiation.*

NASON'S "STANDARD" PATTERN.

VERTICAL WROUGHT IRON WELDED TUBE RADIATORS.



CIRCULAR PATTERN.

USUAL HEIGHT, ABOUT THREE FEET.

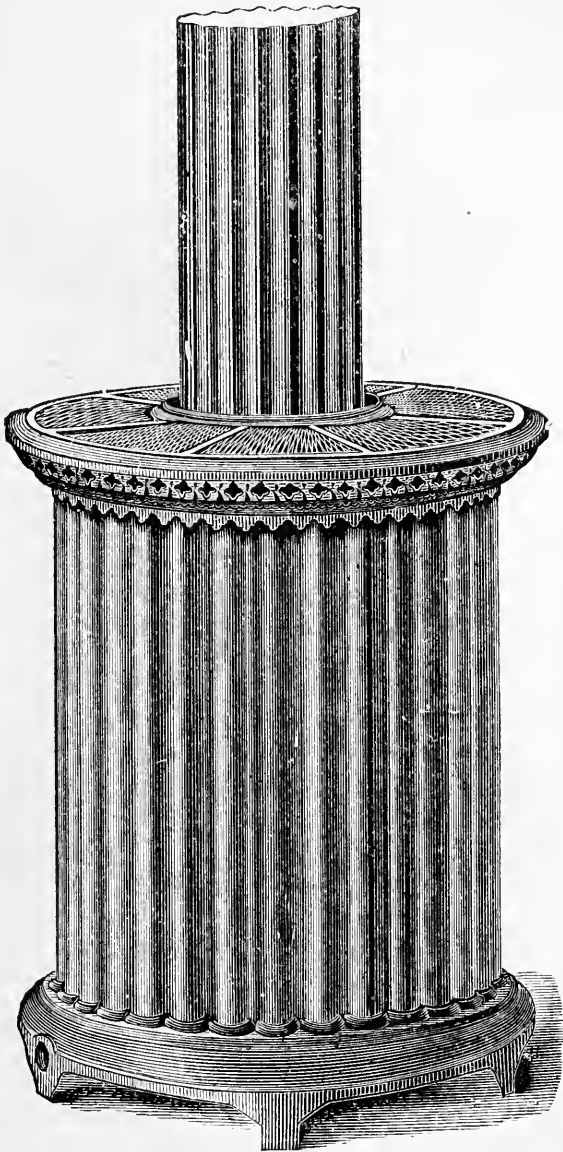
Pattern Number.	No. of Tubes.	Sq. Feet of Radiating Surface.	Outside Diameter at Floor.	Centres of Holes above Floor.		Inlets. Inches.	Outlets. Inches.	Price for Plain.	Price for Bronzed.
				Inlets.	Outlets.				
1	18	18	13½	3¼"	2½"	¾	1¼	11.00	12.25
2	30	30	18	3¼	2⅝	¾	1¼	17.00	19.00
3	54	54	23	3¼	2⅝	¾	1¼	28.50	32.00
4	72	72	25¾	3	2⅞	1	1¼	35.50	40.50
5	102	102	34	4½	4	1	1¼	54.50	62.00
6	130	130	38¼	4⅝	4	1¼	1¼	67.00	76.00
7	160	160	38¼	4⅝	4	1¼	1¼	80.00	91.00

The heating capacity and the cost of Circular Radiators may be varied by leaving out any number of Tubes, except the outer row, without changing the external appearance

The Inlets and Outlets will be tapped as ordered.

NASON'S "STANDARD" PATTERN.

VERTICAL WROUGHT IRON WELDED TUBE RADIATORS.

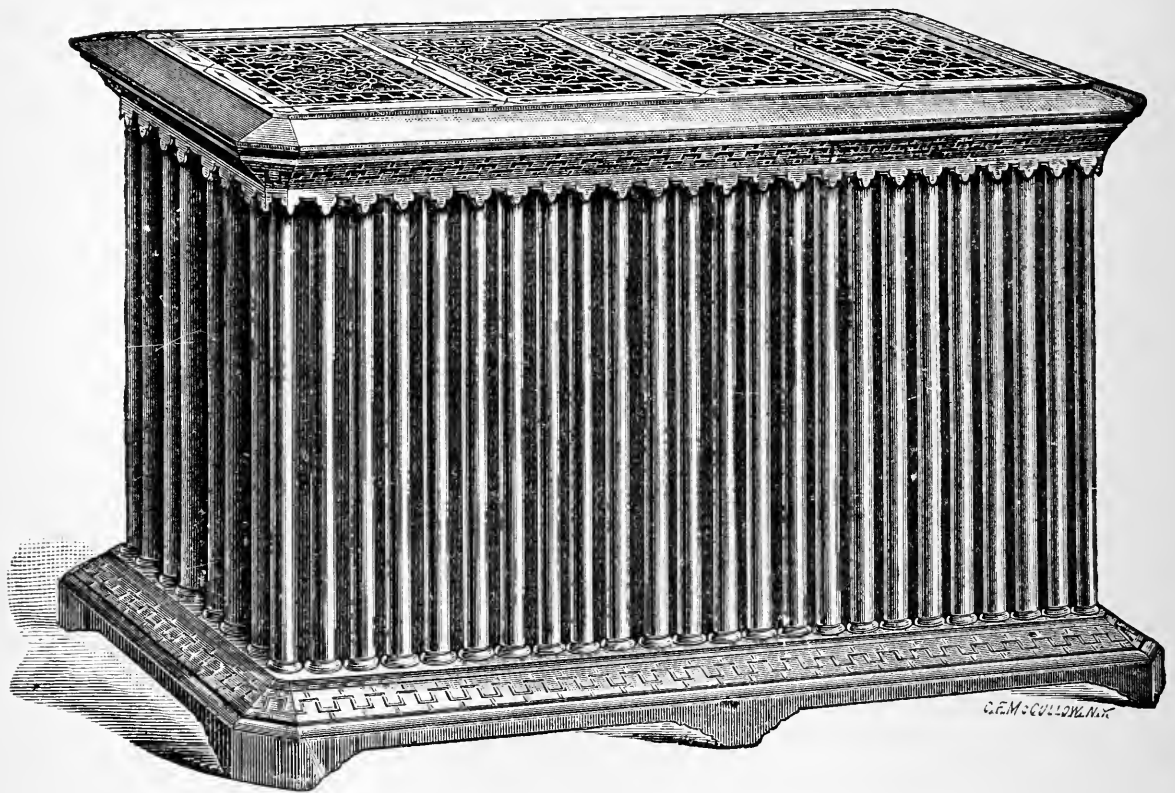


COLUMN RADIATORS.

Made in halves to encircle columns. Made in five sizes. Usual height, 3 feet.

Pattern Number.	No. of Tubes.	Sq. Feet of Radiating Surface.	Outside Diameters at Floor.	Centres of Holes above Floor.		Inlets.	Outlets.	Diameter of Opening in the Base —Inches.	Price for Plain.	Price for Bronzed.
				Inlets.	Outlets.					
1	58	58	27½	5⅛"	4"	¾	1¼	12	33.00	37.00
2	80	80	29¼	4¾	4⅛	1	1¼	12	43.00	48.50
3	102	102	34	4½	4	1	1¼	16	57.00	64.00
4	130	130	38¼	4⅝	4	1¼	1¼	16	72.00	81.00
5	160	160	38¼	4⅝	4	1¼	1¼	16	85.00	96.00

NASON'S "DUPLEX" PATTERN.  
VERTICAL WROUGHT IRON WELDED TUBE RADIATOR.



Size Tubes 8 x 24, 192 Tubes, equal to 192 Square Feet of Surface.  
Outside Dimensions, Length 4 ft. 5½ in., Width, 24½ in.

To our large assortment of RADIATOR PATTERNS we have recently added the size shown above to meet an increasing demand for a Radiator which, while having a larger amount of heating surface, would occupy comparatively little floor area.

There are so many instances in which this is desirable, that the immediate popularity of the radiator is assured. It will be observed from the cut that the rows of tubes are arranged in groups of two, thus leaving a large provision for admitting air up through openings in the base, and rendering the inside rows of tubes nearly as efficient as those on the exterior.

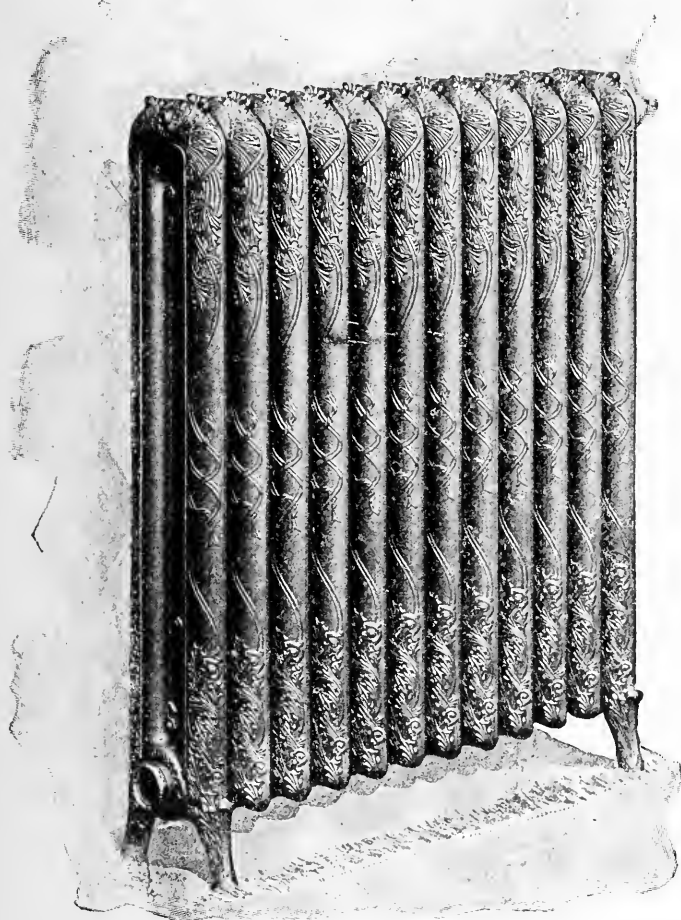
A stock of these, both plain and bronzed, is carried, from which immediate shipments can be made.

Price, plain.....	95.00
“ bronzed.....	110.00
Marble Top, extra, net.....	15.00

We have also patterns for Radiators of special patterns as follows :

7 Tubes wide and 12 tubes long, the tubes arranged “Staggered,” containing in all 81 tubes.	
Price.....	40.00
6 Tubes wide and 12 tubes long, with Open Base, containing in all 72 tubes.	
Price.....	35.00





NATIONAL DIRECT  
STEAM AND  
WATER RADIATORS.

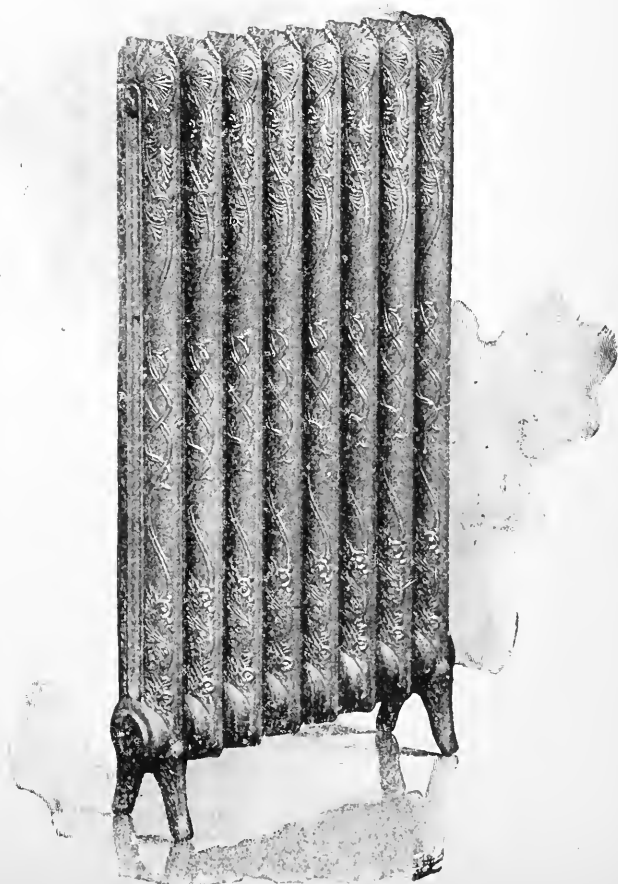
For Dimensions, etc., see page 377.

For List Prices see page 380.

NATIONAL DIRECT  
SINGLE COLUMN STEAM  
AND HOT WATER  
RADIATORS.

For Lists of Dimensions, etc., see page 379.

For List Prices see page 380.







PEERLESS  
DIRECT STEAM  
AND  
WATER RADIATORS.

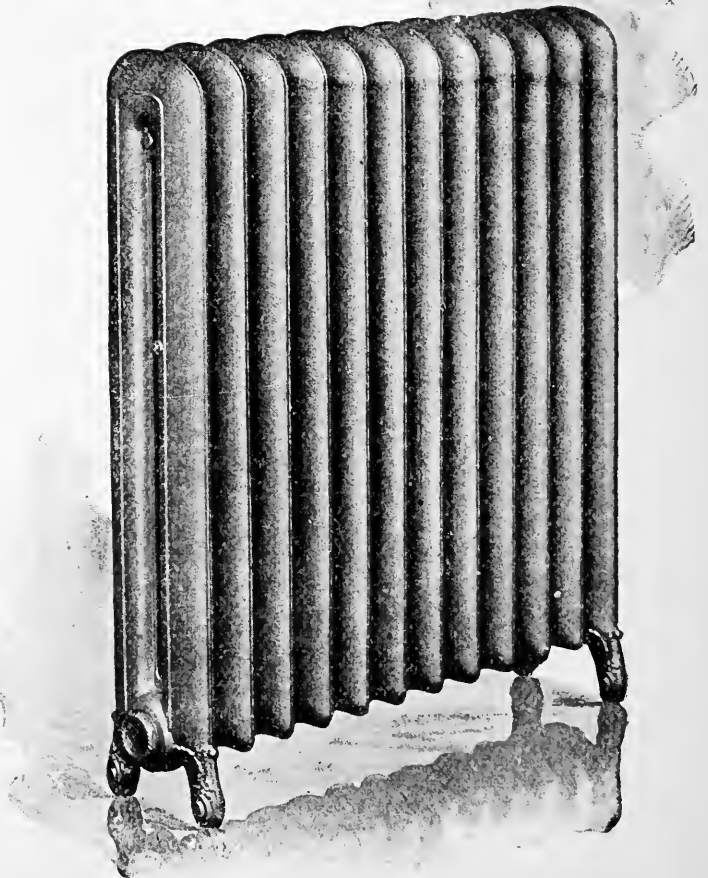
For Dimensions, etc., see page 377.

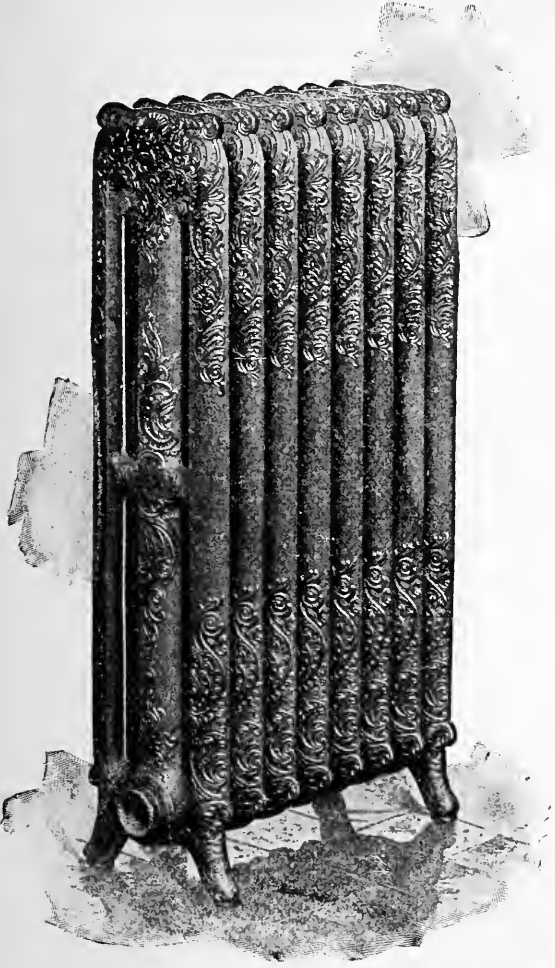
For List Prices see page 380.

PERFECTION DIRECT  
STEAM AND  
WATER RADIATORS.

For Dimensions, etc., see page 378.

For List Prices see page 380.





ROCOCO DIRECT  
STEAM AND WATER  
RADIATORS.

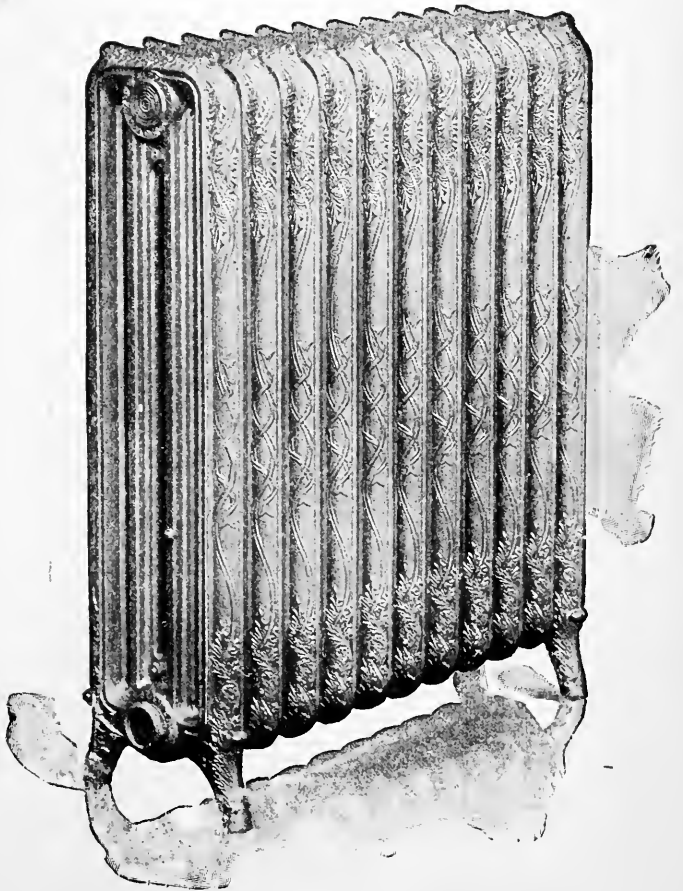
For Dimensions, etc., see page 376.

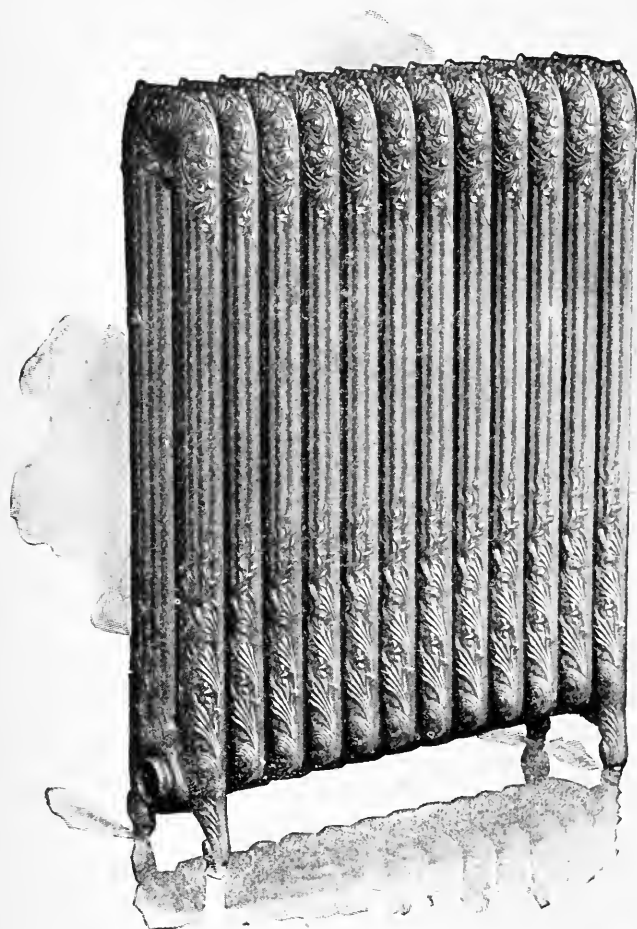
For List Prices see pages 380.

NATIONAL  
FOUR-COLUMN DIRECT  
STEAM OR WATER  
RADIATORS.

For Dimensions, etc., see page 379.

For List Prices see page 380.





DETROIT  
ORNAMENTAL  
FLUTED DIRECT  
STEAM AND WATER  
RADIATORS.

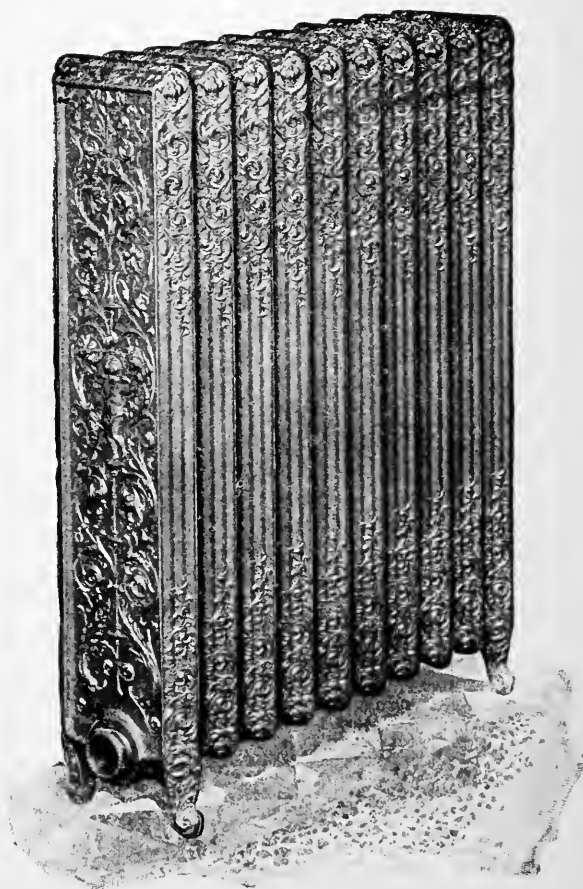
For Dimensions, etc., see page 378.

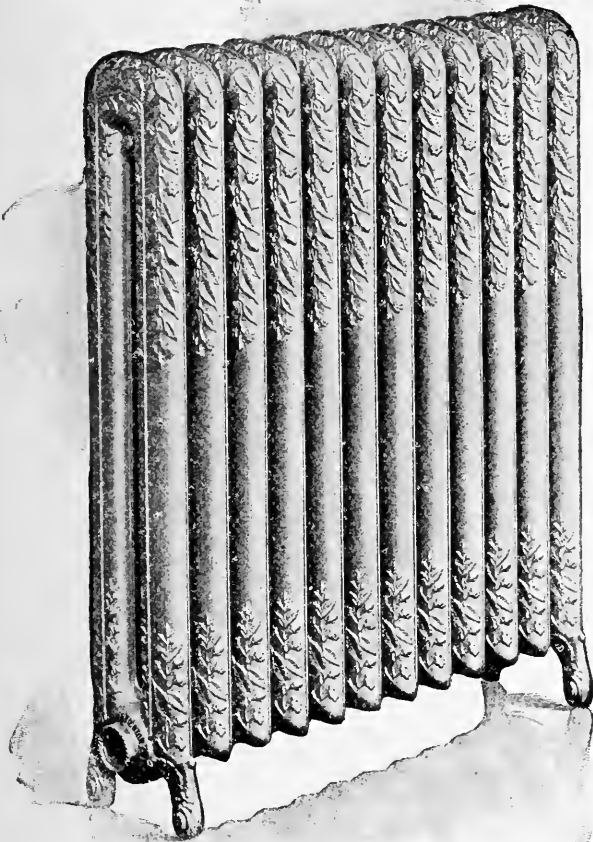
For List Prices see page 380.

ITALIAN FLUE DIRECT  
STEAM AND WATER  
RADIATORS.

For Dimensions, etc., see page 377.

For List Prices see page 380.





IDEAL DIRECT  
STEAM RADIATORS.

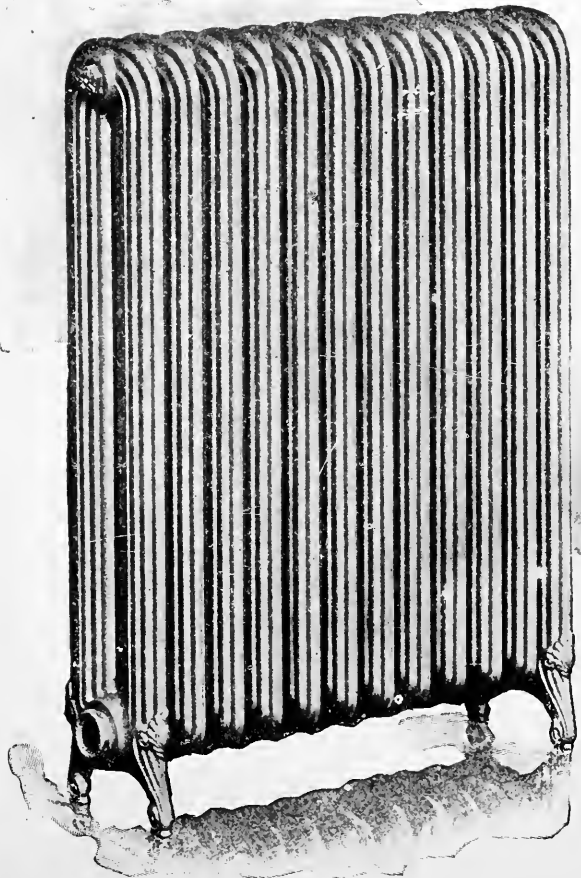
For Dimensions, etc., see page 376.

For List Prices see page 380.

DETROIT PLAIN  
FLUTED DIRECT  
STEAM AND  
WATER  
RADIATORS.

For Dimensions, etc.,  
see page 378.

For List Prices see page 380.



ROCOCO DIRECT HOT WATER RADIATORS.

LIST OF SIZES.

HEATING SURFACE—SQUARE FEET.									
No. of Sections.	*Length 2½ in. per Sec.	38 in. Height.		32 in. Height.		26 in. Height.		22 in. Height.	
		5 Sq. Ft. per Sec.	3 Sq. Ft. per Sec.	4½ Sq. Ft. per Sec.	3½ Sq. Ft. per Sec.	3½ Sq. Ft. per Sec.	3 Sq. Ft. per Sec.	3 Sq. Ft. per Sec.	2½ Sq. Ft. per Sec.
2	5	12	10	9	7½	6	4½	6¾	4½
3	7½	18	15	13½	11¼	9	6¾	9	6¾
4	10	24	20	18	15	12	9	12	9
5	12½	30	25	22½	18¾	15	11¼	15	11¼
6	15	36	30	27	22½	18	13½	18	13½
7	17½	42	35	31½	26¼	21	15¾	21	15¾
8	20	48	40	36	30	24	18	24	18
9	22½	54	45	40½	33¾	27	20¼	27	20¼
10	25	60	50	45	37½	30	22½	30	22½
11	27½	66	55	49½	41¼	33	24¾	33	24¾
12	30	72	60	54	45	36	27	36	27
13	32½	78	65	58½	48¾	39	29¼	39	29¼
14	35	84	70	63	52½	42	31½	42	31½
15	37½	90	75	67½	56¼	45	33¾	45	33¾
16	40	96	80	72	60	48	36	48	36
17	42½	102	85	76½	63¾	51	38¼	51	38¼
18	45	108	90	81	67½	54	40½	54	40½
19	47½	114	95	85½	71¼	57	42¾	57	42¾
20	50	120	100	90	75	60	45	60	45
21	52½	126	105	94½	78¾	63	47¼	63	47¼
22	55	132	110	99	82½	66	49½	66	49½
23	57½	138	115	103½	86¼	69	51¾	69	51¾
24	60	144	120	108	90	72	54	72	54
25	62½	150	125	112½	93¾	75	56¼	75	56¼
26	65	156	130	117	97½	78	58½	78	58½
27	67½	162	135	121½	101¼	81	60¾	81	60¾
28	70	168	140	126	105	84	63	84	63
29	72½	174	145	130½	108¾	87	65¼	87	65¼
30	75	180	150	135	112½	90	67½	90	67½
31	77½	186	155	139½	116¼	93	69¾	93	69¾
32	80	193	160	144	120	96	72	96	72

Unless otherwise ordered, the Rococo Radiators are tapped 2 inches, and bushed according to list on page 380.  
Each section is 10 inches wide. Width of legs, 10¼ inches.  
All openings will have right-hand threads, unless otherwise ordered.  
Top of each hot water leg section has 1½-inch plug, which can be taken out to make top connection when desired.  
Can furnish Rococo Radiators connected either with right and left hand threaded nipples or with slip nipples, as customer may prefer.  
Distance from floor to center of either supply or return tapping is 4½ inches, single pipe steam; 4½ inches supply, 4 inches return, for double pipe steam; hot water, 4½ inches either supply or return.

\* In estimating length of Radiator, allow ½ inch for each bushing.

IDEAL DIRECT STEAM RADIATORS.  
LIST OF SIZES.

HEATING SURFACE—SQUARE FEET.									
No. of Sections.	*Length 2½ in. per Sec.	45 in. Height.		38 in. Height.		32 in. Height.		26 in. Height.	
		5 Sq. Ft. per Sec.	4 Sq. Ft. per Sec.	4 Sq. Ft. per Sec.	3½ Sq. Ft. per Sec.	3½ Sq. Ft. per Sec.	3 Sq. Ft. per Sec.	2½ Sq. Ft. per Sec.	20 in. Height. 2 Sq. Ft. per Sec.
2	5	10	8	6¾	5½	4¾	4	4	4
3	7½	15	12	10	8	7	6	6	6
4	10	20	16	13½	10½	9½	8	8	8
5	12½	25	20	16¾	13¼	11¾	10	10	10
6	15	30	24	20	16	14	12	12	12
7	17½	35	28	23½	18½	16¾	14	14	14
8	20	40	32	26¾	21¼	18¾	16	16	16
9	22½	45	36	30	24	21	18	18	18
10	25	50	40	33½	26¾	23¾	20	20	20
11	27½	55	44	36¾	29¼	25¾	22	22	22
12	30	60	48	40	32	28	24	24	24
13	32½	65	52	43½	34¾	30¾	26	26	26
14	35	70	56	46¾	37½	32¾	28	28	28
15	37½	75	60	50	40	35	30	30	30
16	40	80	64	53½	42¾	37½	32	32	32
17	42½	85	68	56¾	45¼	39¾	34	34	34
18	45	90	72	60	48	42	36	36	36
19	47½	95	76	63½	50¾	44¾	38	38	38
20	50	100	80	66¾	53¼	46¾	40	40	40
21	52½	105	84	70	56	49	42	42	42
22	55	110	88	73½	58¾	51¾	44	44	44
23	57½	115	92	76¾	61¼	53¾	46	46	46
24	60	120	96	80	64	56	48	48	48
25	62½	125	100	83½	66¾	58¾	50	50	50
26	65	130	104	86¾	69¼	60¾	52	52	52
27	67½	135	108	90	72	63	54	54	54
28	70	140	112	93½	74¾	65¾	56	56	56
29	72½	145	116	96¾	77¼	67¾	58	58	58
30	75	150	120	100	80	70	60	60	60
31	77½	155	124	103½	82¾	72¾	62	62	62
32	80	160	128	106¾	85¼	74¾	64	64	64

Unless otherwise ordered, Ideal Steam Radiators in 38-inch Height are tapped 2 inches and bushed according to list on page 380; other heights are tapped solid according to same list.  
Each section is 7½ inches wide. Width of legs, 8½ inches.  
All openings will have right-hand threads, unless otherwise ordered.  
Connected at bottom with 2-inch right-hand threaded nipples.  
Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, supply 4½ inches, return 4 inches. In other than 38-inch Height of Ideal Steam Radiators, distance from floor to center of either supply or return tapping is 4½ inches.

\* In estimating length of 38-inch Ideal Steam Radiators, allow ½ inch for each bushing.



NATIONAL AND PEERLESS DIRECT  
STEAM AND WATER RADIATORS.

LIST OF SIZES.

No. of Sections.	HEATING SURFACE—SQUARE FEET.						
	*Length, 2½ in. per Sec.	45-in. Height 5 Sq. Ft. per Sec.	38-in. Height 4 Sq. Ft. 3½ Sq. Ft. per Sec.	32 in. Height 3½ Sq. Ft. 2½ Sq. Ft. per Sec.	26-in. Height 2½ Sq. Ft. 2 Sq. Ft. per Sec.	23-in. Height 2½ Sq. Ft. 2 Sq. Ft. per Sec.	20-in. Height 2 Sq. Ft. per Sec.
2	5	10	8	6½	5½	4½	4
3	7½	15	12	10	8	7	6
4	10	20	16	13½	10½	9½	8
5	12½	25	20	16½	13½	11½	10
6	15	30	24	20	16	14	12
7	17½	35	28	23½	18½	16½	14
8	20	40	32	26½	21½	18½	16
9	22½	45	36	30	24	21	18
10	25	50	40	33½	26½	23½	20
11	27½	55	44	36½	29½	25½	22
12	30	60	48	40	32	28	24
13	32½	65	52	43½	34½	30½	26
14	35	70	56	46½	37½	32½	28
15	37½	75	60	50	40	35	30
16	40	80	64	53½	42½	37½	32
17	42½	85	68	56½	45½	39½	34
18	45	90	72	60	48	42	36
19	47½	95	76	63½	50½	44½	38
20	50	100	80	66½	53½	46½	40
21	52½	105	84	70	56	49	42
22	55	110	88	73½	58½	51½	44
23	57½	115	92	76½	61½	53½	46
24	60	120	96	80	64	56	48
25	62½	125	100	83½	66½	58½	50
26	65	130	104	86½	69½	60½	52
27	67½	135	108	90	72	63	54
28	70	140	112	93½	74½	65½	56
29	72½	145	116	96½	77½	67½	58
30	75	150	120	100	80	70	60
31	77½	155	124	103½	82½	72½	62
32	80	160	128	106½	85½	74½	64

Unless otherwise ordered, above Radiators are tapped 2 inches and bushed according to list on page 380.  
Each section is 7½ inches wide. Width of legs, 8½ inches.  
All openings will have right-hand threads, unless otherwise ordered.  
Steam connected at bottom with 2-inch right-hand threaded nipples; Hot Water connected top and bottom with 2½ inch extra heavy slip nipples.  
Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, supply 4½ inches, return 4 inches; Hot Water, supply and return, 4½ inches.

\*In estimating length of Radiators, allow ½ inch for each bushing.

ITALIAN FLUE STEAM AND HOT  
WATER RADIATORS.

LIST OF SIZES.

No. of Sections.	*Length, 3 inches per Sec.	HEATING SURFACE—SQUARE FEET.			
		38 in. Height 7 Sq. Ft. per Sec.	32-in. Height 5½ Sq. Ft. per Sec.	26 in. Height 4½ Sq. Ft. per Sec.	20 in. Height 3¼ Sq. Ft. per Sec.
2	6	14	11½	9	6½
3	9	21	17¼	13½	9¾
4	12	28	23	18	13
5	15	35	28¾	22½	16¼
6	18	42	34½	27	19½
7	21	49	40¼	31½	22¾
8	24	56	46	36	26
9	27	63	51¾	40½	29¼
10	30	70	57½	45	32½
11	33	77	63¼	49½	35¾
12	36	84	69	54	39
13	39	91	74¾	58½	42¼
14	42	98	80½	63	45½
15	45	105	86¼	67½	48¾
16	48	112	92	72	52
17	51	119	97¾	76½	55¼
18	54	126	103½	81	58½
19	57	133	109¼	85½	61¾
20	60	140	115	90	65
21	63	147	120¾	94½	68¼
22	66	154	126½	99	71½
23	69	161	132¼	103½	74¾
24	72	168	138	108	78
25	75	175	143¾	112½	81¼

Unless otherwise ordered, the Italian Flue Radiators are tapped 2 inches, and bushed according to list on page 380.  
Each section is 8½ inches wide.

All openings will have right-hand threads unless otherwise ordered.

Connected with extra-heavy right and left hand threaded nipples; Steam, 2 inches at bottom; Hot water, 1½ inches at top, 2 inches at bottom.

Top of each Italian Flue Hot Water leg section has 1½ inch plug, which can be taken out to make top connection when desired.

Distance from floor to center of supply tapping: single pipe Steam, 4 inches; double pipe Steam, 4½ inches supply, 4 inches return; Hot Water, 4½ inches supply and return.

\* In estimating length of Radiator, allow ½ inch for each bushing.

PERFECTION DIRECT STEAM AND HOT WATER RADIATORS.  
LIST OF SIZES.

HEATING SURFACE—SQUARE FEET.									
No. of Sections.	*Length, 2½-in. per Sec.	45-in. Height.	38-in. Height.	32-in. Height.	26-in. Height.	23-in. Height.	20-in. Height.	2 Sq. Ft. per Sec.	per Sec.
		5 Sq. Ft. per Sec.	4 Sq. Ft. per Sec.	3½ Sq. Ft. per Sec.	2¾ Sq. Ft. per Sec.	2½ Sq. Ft. per Sec.	2 Sq. Ft. per Sec.		
2	5 7/8	10	8	6 3/4	5 1/4	4 3/4	4		
3	7 1/8	15	12	10	8	7	6		
4	10	20	16	13 1/4	10 3/4	9 1/4	8		
5	12 1/2	25	20	16 1/2	13 1/4	11 3/4	10		
6	15	30	24	20	16	14	12		
7	17 1/2	35	28	23 1/4	18 3/4	16 1/4	14		
8	20	40	32	26 3/4	21 3/4	18 3/4	16		
9	22 1/2	45	36	30	24	21	18		
10	25	50	40	33 1/4	26 3/4	23 1/4	20		
11	27 1/2	55	44	36 3/4	29 3/4	25 3/4	22		
12	30	60	48	40	32	28	24		
13	32 1/2	65	52	43 1/4	34 3/4	30 3/4	26		
14	35	70	56	46 3/4	37 1/4	32 3/4	28		
15	37 1/2	75	60	50	40	35	30		
16	40	80	64	53 1/4	42 3/4	37 1/4	32		
17	42 1/2	85	68	56 3/4	45 3/4	39 3/4	34		
18	45	90	72	60	48	42	36		
19	47 1/2	95	76	63 1/4	50 3/4	44 1/4	38		
20	50	100	80	66 3/4	53 3/4	46 3/4	40		
21	52 1/2	105	84	70	56	49	42		
22	55	110	88	73 1/4	58 3/4	51 1/4	44		
23	57 1/2	115	92	76 3/4	61 3/4	53 3/4	46		
24	60	120	96	80	64	56	48		
25	62 1/2	125	100	83 1/4	66 3/4	58 3/4	50		
26	65	130	104	86 3/4	69 3/4	61 3/4	52		
27	67 1/2	135	108	90	72	63	54		
28	70	140	112	93 1/4	74 3/4	65 3/4	56		
29	72 1/2	145	116	96 3/4	77 1/4	67 3/4	58		
30	75	150	120	100	80	70	60		
31	77 1/2	155	124	103 1/4	82 3/4	72 1/4	62		
32	80	160	128	106 3/4	85 3/4	74 3/4	64		

Unless otherwise ordered, the above Radiators will be tapped 2 inches and bushed in accordance with list on page 380.  
Perfection Hot Water is not made in 23-in. height.  
Each section is 7¼ inches wide. Width of legs, 9¼ inches.  
All openings will have right-hand threads, unless otherwise ordered.  
Perfection Steam connected at bottom with extra heavy 2-inch, right and left hand threaded nipples; Hot Water, 1½ inches at top and bottom.  
Distance from floor to center of tapping: single pipe Steam, 4 inches, double pipe Steam 4½ inches supply, 4 inches return; Hot Water supply and return, 4½ inches.  
\*In estimating length of Radiator, allow ½ inch for each bushing.  
Top of each Perfection Hot Water leg section has 1½-inch plug, which can be taken out to make top connection when desired.

DETROIT ORNAMENTAL FLUTED AND DETROIT PLAIN FLUTED  
DIRECT STEAM AND HOT WATER RADIATORS.  
LIST OF SIZES.

HEATING SURFACE—SQUARE FEET.									
No. of Sections.	*Length, 2½-in. per Sec.	45-in. Height.	38-in. Height.	32-in. Height.	25-in. Height.	20-in. Height.	2 Sq. Ft. per Sec.	per Sec.	per Sec.
		5¼ Sq. Ft. per Sec.	4¾ Sq. Ft. per Sec.	3¾ Sq. Ft. per Sec.	2¾ Sq. Ft. per Sec.	2¼ Sq. Ft. per Sec.			
2	4 5/8	10 1/2	8 3/4	7	5 1/2	4 1/2			
3	6 1/8	15 3/4	13	10 1/4	8 1/4	6 3/4			
4	9 1/4	21	17 1/2	14	11	9			
5	11 9/16	26 1/2	21 3/8	17 1/2	13 3/4	11 1/4			
6	13 1/8	31 3/8	26	21	16 3/8	13 3/8			
7	16 1/8	36 3/4	30 3/8	24 1/2	19 1/4	15 3/4			
8	18 1/2	42	34 3/8	28	22	18			
9	20 1/2	47 1/4	39	31 1/2	24 3/4	20 1/4			
10	23 1/8	52 3/4	43 1/8	35	27 1/2	22 1/2			
11	25 1/4	57 3/4	47 3/8	38 1/2	30 3/4	24 3/4			
12	27 3/4	63	52	42	33	27			
13	30 3/8	68 1/4	56 1/2	45 1/2	35 3/4	29 1/4			
14	32 3/8	73 3/4	60 3/8	49	38 3/4	31 3/4			
15	34 1/2	78 3/4	65	52 1/2	41 1/4	33 3/4			
16	37	84	69 1/2	56	44	36			
17	39 1/2	89 1/4	73 3/8	59 1/2	46 3/4	38 1/4			
18	41 3/8	94 3/4	78	63	49 3/4	40 3/4			
19	43 1/2	99 3/4	82 1/2	66 1/2	52 1/4	42 1/4			
20	46 1/4	105	86 3/8	70	55	45			
21	48 9/16	110 1/4	91	73 1/2	57 3/4	47 1/4			
22	50 3/8	115 3/4	95 1/2	77	60 3/4	49 1/4			
23	53 1/8	120 3/4	99 3/8	80 1/2	63 1/4	51 3/4			
24	55 1/2	126	104	84	66	54			
25	57 1/2	131 1/4	108 1/2	87 1/2	68 3/4	56 1/4			
26	60 3/8	136 3/4	112 3/8	91	71 1/2	58 3/4			
27	62 1/2	141 3/4	117	94 1/2	74 1/4	60 3/4			
28	64 3/4	147	121 1/2	98	77	63			
29	67 1/8	152 1/4	125 3/8	101 1/2	79 3/4	65 1/4			
30	69 3/8	157 3/4	130	105	82 1/2	67 3/4			
31	71 1/2	162 3/4	134 1/2	108 1/2	85 3/4	69 3/4			
32	74	168	138 3/8	112	88	72			

Unless otherwise ordered, these Radiators will be tapped 2 inches and bushed according to list on page 380.  
Each section is 8 inches wide. Width of legs, 8½ inches.  
All openings will have right-hand threads, unless otherwise ordered.  
Connected with extra-heavy right and left hand threaded nipples: Steam, 2 inches at bottom; Hot Water, 1½ inches at top, 2 inches at bottom.  
Top of each Hot Water leg section has 1½-inch plug, which can be taken out to make top connection when desired.  
Distance from floor to center of tapping: single pipe Steam, 4 inches; double pipe Steam, 4½ inches supply, 4 inches return; Hot Water, supply and return, 4½ inches.  
\*In estimating length of Radiator, allow ½ inch for each bushing.



# NATIONAL SINGLE COLUMN DIRECT STEAM AND HOT WATER RADIATORS. LIST OF SIZES.

No. of Sections.	*Length, 2½ in. per Sec.	HEATING SURFACE—SQUARE FEET.				
		38-in. Height, 3 Sq. Ft. per Sec.	32-in. Height, 2½ Sq. Ft. per Sec.	26-in. Height, 2 Sq. Ft. per Sec.	23-in. Height, 1½ Sq. Ft. per Sec.	20-in. Height, 1½ Sq. Ft. per Sec.
2	5	6	5	4	3½	3½
3	7½	9	7½	6	5½	4½
4	10	12	10	8	6½	6
5	12½	15	12½	10	8½	7½
6	15	18	15	12	10	9
7	17½	21	17½	14	11½	10½
8	20	24	20	16	13½	12
9	22½	27	22½	18	15½	13½
10	25	30	25	20	17½	15
11	27½	33	27½	22	19½	16½
12	30	36	30	24	21½	18
13	32½	39	32½	26	23½	19½
14	35	42	35	28	25½	21
15	37½	45	37½	30	27½	22½
16	40	48	40	32	29½	24
17	42½	51	42½	34	31½	25½
18	45	54	45	36	33½	27
19	47½	57	47½	38	35½	28½
20	50	60	50	40	37½	30
21	52½	63	52½	42	39½	31½
22	55	66	55	44	41½	33
23	57½	69	57½	46	43½	34½
24	60	72	60	48	45½	36
25	62½	75	62½	50	47½	37½
26	65	78	65	52	49½	39
27	67½	81	67½	54	51½	40½
28	70	84	70	56	53½	42
29	72½	87	72½	58	55½	43½
30	75	90	75	60	57½	45
31	77½	93	77½	62	59½	46½
32	80	96	80	64	61½	48

Unless otherwise ordered, National Single Column Steam Radiators are tapped *solid*, according to list on page 380. Unless otherwise ordered, National Single Column Hot Water Radiators are tapped 2 inches, and bushed according to list on page 380.

Each section is ½ inches wide. Width of legs, 5½ inches.

All openings will have right-hand threads, unless otherwise ordered.

National Single Column Radiators for Steam are connected with 2-inch, right-hand threaded, extra-heavy nipples; for Hot Water, 2¼-inch extra-heavy slip nipples, at top and bottom.

Distance from floor to center of tapping is 4½ inches, for both Steam and Hot Water.

\* In estimating *length* of this Radiator for Hot Water, allow ½ inch for each bushing.

# NATIONAL FOUR COLUMN DIRECT STEAM OR HOT WATER RADIATOR. LIST OF SIZES.

HEATING SURFACE—SQUARE FEET.						
No. of Sections.	*Length 2½ inches. per Sec.	38-in. Height. 8 Sq. Ft. per Sec.	32-in. Height. 6½ Sq. Ft. per Sec.	26-in. Height. 5½ Sq. Ft. per Sec.	23-in. Height. 4½ Sq. Ft. per Sec.	20-in. Height. 4 Sq. Ft. per Sec.
2	5½	16	13½	10½	9½	8
3	8½	24	20	16	14	12
4	11	32	26½	21½	18½	16
5	13½	40	33½	26½	23½	20
6	16½	48	40	32	28	24
7	19½	56	46½	37½	32½	28
8	22	64	53½	42½	37½	32
9	24½	72	60	48	42	36
10	27½	80	66½	53½	46½	40
11	30½	88	73½	58½	51½	44
12	33	96	80	64	56	48
13	35½	104	86½	69½	60½	52
14	38½	112	93½	74½	65½	56
15	41½	120	100	80	70	60
16	44	128	106½	85½	74½	64
17	46½	136	113½	90½	79½	68
18	49½	144	120	96	84	72
19	52½	152	126½	101½	88½	76
20	55	160	133½	106½	93½	80
21	57½	168	140	112	98	84
22	60½	176	146½	117½	102½	88
23	63½	184	153½	122½	107½	92
24	66	192	160	128	112	96
25	68½	200	166½	133½	116½	100

Unless otherwise ordered, National Four Column Radiators are tapped 2 inches, and bushed according to list on page 380.

Each section is 10½ inches wide; width of legs, 1¼ inches.

All openings will have right-hand threads, unless otherwise ordered.

Connected at top and bottom with extra-heavy 2¼-inch slip nipples.

Distance from center of either supply or return tapping to floor is 4½ inches.

\* In estimating *length* of a Radiator, allow ½ inch for each bushing.

PRICE LIST OF DIRECT "AMERICAN" STEAM AND WATER RADIATION.

PER SQUARE FOOT OF HEATING SURFACE.

Height, inches.....	45	38	32	31	26	25	23	22	20	19	18	16	15	14	13
Verona Steam and Water (not illustrated).....	--	84	92	--	98	--	--	--	1-14	--	--	--	--	--	--
Perfection, Steam or Water (illustrated).....	41	42	46	--	49	--	53	--	57	--	--	--	--	--	--
Detroit Ornamental, Steam or Water (illustrated).....	41	42	--	46	--	49	--	--	57	--	--	--	--	--	--
Detroit Plain Fluted, Steam or Water (illustrated).....	41	42	--	46	--	49	--	--	57	--	--	--	--	--	--
National, Steam or Water (illustrated).....	41	42	46	--	49	--	53	--	57	--	--	--	--	--	--
Ideal, Steam (illustrated).....	41	42	46	--	49	--	53	--	57	--	--	--	--	--	--
Peerless, Steam or Water (illustrated).....	41	42	46	--	49	--	53	--	57	--	--	--	--	--	--
Excelsior, C. I. Top, Steam (not illustrated).....	--	42	--	46	--	49	--	53	--	57	--	--	--	--	--
National, Single Column, Steam or Water (illus.).....	--	42	46	--	49	--	53	--	57	--	--	--	--	--	--
Rococo, Steam or Water (illustrated).....	41	42	46	--	49	--	53	--	--	--	58	--	--	--	--
National, Four Column, Steam or Water (illustrated).....	--	42	46	--	49	--	53	--	57	--	--	--	--	--	--
Italian Flue, Steam or Water (illustrated).....	--	42	46	--	49	--	--	--	57	--	--	--	--	--	--
Monarch, Flue, Steam (not illustrated).....	--	42	46	--	49	--	53	--	--	--	60	62	64	--	--
Detroit, Flue, Steam or Water (not illustrated).....	--	--	--	--	--	--	--	--	57	--	58	60	--	64	66

AMERICAN SPECIALTIES.

	Steam.	Water.	
Column.....	.58	.92	per section added to lists for Direct Radiators.
Curved.....	.58	.92	" " " "
Corner.....	3.80	4.75	per Radiator " " "
Window.....	.16	.32	per Section " " "
Stairway.....	.34		" " " "
Direct-Indirect.....	.20	.20	" " " "

TAPPING LIST.

Unless otherwise ordered, "American Direct Steam and Water Radiators" are tapped as follows:

ONE PIPE WORK.—RADIATORS CONTAINING	TWO PIPE WORK.—RADIATORS CONTAINING
24 square feet and under.....1 inch.	48 square feet and under.....1 x 3/4 in.
Above 24, but not exceeding 60 feet.1 1/4 "	Above 48, but not exceeding 96 ft.1 1/4 x 1 in.
Above 60, " " 100 feet.1 1/2 "	Above 96 square feet.....1 1/2 x 1 1/4 in.
Above 100 square feet.....2 "	

HOT WATER.—TAPPED FOR SUPPLY AND RETURN.

Radiators, containing 40 square feet and under.....1 inch.	
Above 40, but not exceeding 72 sq ft.1 1/4 inch.	Above 72 square feet.....1 1/2 "

NOTE—Special tapplings can be furnished when desired.

GENERAL AND PRACTICAL  
INFORMATION

PERTAINING TO

Steam and Hot Water Heating

COMPILED BY

NASON MANUFACTURING CO.

FROM THE WORKS OF

BALDWIN'S STEAM HEATING FOR BUILDINGS,

HOOD'S HOT WATER HEATING,

BOX'S PRACTICAL TREATISE ON HEAT,

HASWELL'S ENGINEERING MANUAL,

AND MANY OTHERS.

## AMERICAN PRACTICE OF WARMING BUILDINGS BY STEAM.

“The application of steam to the warming of buildings in the United States originated with the late Mr. Joseph Nason. He was not only the first to make the attempt, but also the originator, improver and adapter of much that is essential and now implicitly followed in the general arrangement and details of the apparatus employed. His earliest endeavor in America was to adapt the Perkins system of hot water inside small tubes for meeting the severity of that climate. The large extent of warming surface and the great strength presented by steam apparatus constructed of small and comparatively inexpensive wrought-iron tubes, and the facility thereby afforded for transmitting heat in any direction from a central source, are merits which led to so rapid a development of this system of warming, that by 1860, or in less than 20 years, there were already many hundred establishments throughout America for the manufacture of the apparatus.

With the maturing of this system was associated the name of Mr. James J. Walworth, of Boston, brother-in-law and partner of Mr. Nason.”—*From a paper by* ROBERT BRIGGS, *M. Inst. C.E.*

*The method of warming buildings by steam* depends upon the rapid condensation of steam into water when admitted into any vessel which is not so hot as itself. At the moment of condensation the latent heat of the steam is given out to the vessel containing it, and thus diffuses the heat to the surrounding space.

A *low-pressure gravity apparatus* is the most healthful, economical, cleanly and perfect heating appliance known, and may be constructed to heat a single room or the largest building with a uniformity which cannot be attained by any other means.

A gravity apparatus is one without an outlet whose circulation is perfect, wasting no water and requiring no mechanical means for returning the water of condensation to the boiler. It has been very properly likened unto the circulation of blood in the human system.

This form of apparatus is extensively employed in warming private houses, churches, schools and other public buildings, with very satisfactory results. Its chief merits are, its safety, noiselessness, the ease with which it is managed, the low and uniform temperature of its surfaces, and the positive return of the water of condensation to the boiler under all conditions.

**A Low-Pressure Gravity Circulation Apparatus** consists of—

*The Boiler* with its various attachments for the automatic regulation of its draughts and pressures.

*Main Steam Pipes and Risers* for conveying the steam to the various parts of a building to be warmed, and the corresponding return risers and mains for the return of condensation to the boiler.

*Relief Pipes* for relieving the mains and risers of the water of condensation and for equalizing the pressure throughout the apparatus.

*Radiators or other heating surfaces* for the several rooms to be warmed, with their necessary valves and connections.

**There are three systems** by which the steam may be communicated when desired.

1st. *By direct radiation*, consisting of Radiators as illustrated on pages 356 to 359, or other surfaces placed within a room or building to warm the air and maintain its temperature. This system is not connected with any definite method of ventilation.

2d. *By direct-indirect radiation*, embracing radiating surfaces placed within or partly within the several rooms to be warmed, in direct communication with some system of ventilation. The

heaters are usually placed on outside walls or under windows, to which air is admitted through flues from outside the building. They warm the air again and again, and also all that is admitted for ventilation. This form of heater is illustrated on pages 360 to 364.

3d. *By indirect radiation*, embracing all heating surfaces placed outside the rooms to be warmed, and can only be used in connection with some system of ventilation. This form of surface warms only the air that passes into a room, and has to raise the temperature of all the air admitted to that necessary to maintain any desired temperature, and make up the loss by ventilation. This surface is generally divided into many parts and placed near the lower ends of vertical flues leading to the several rooms to be warmed. For this method of surface a building should be arranged especially with some definite system of flues sufficient to change the entire air of an apartment at least once in an hour.

**There are five systems** by which a building may be furnished with circulation pipes for a steam apparatus.

1st. *With main steam pipes and risers*, with accompanying return pipes. When properly constructed and with pipes of sufficient area, this method will work satisfactorily at any pressure, and is the system usually employed in large buildings.

2d. *With main steam pipes and risers*, with accompanying return main and with separate return risers for each coil or heater. These several return risers must not connect with each other except below the water line of the boiler. When properly constructed this method will be perfectly noiseless and the air in the pipes is readily disposed of. This system should always be used in private houses and in buildings where extremely low pressures are employed.

3d. *Main steam pipes and risers* with corresponding return mains, but without separate return risers, the steam risers conveying the water of condensation back through a relief to the main return pipes on floor of basement.

4th. *A single pipe system* in which there is but one steam pipe run from the top of the boiler and thence vertically to the several radiators which it is to supply—single branches being taken off for each. The water of condensation returns through these to the steam pipe, and considerable pitch is necessary to insure the water returning against the steam current.

This system is not advised except where the distances to be run horizontally are small and the radiating surfaces standing nearly in a line above the other.

5th. *A single pipe for every heater* runs direct from the top of the boiler, rising continually toward the heaters, and with sufficient area to allow the steam to rise to the heaters, while the water of condensation is returned through the same pipes to the boiler. This system is identical with that described in No. 4, except that the steam supply pipe being sub-divided there is less difficulty likely to occur from conflict of the currents of steam and water of condensation.

By systems Nos. 3, 4 and 5 a slight saving in the first cost of the apparatus is made, consisting of a return line of piping, and rendering necessary but a single valve for each of the heaters: These systems are not, however, recommended except for very small apparatus.

*The low pressure gravity apparatus* depends for a circulation on the difference of level of water in the return riser and the boiler without regard to the steam pressure in any part of the distributing pipes, but the maximum pressure of steam carried must never exceed the equivalent of a difference in the level of the water between the water line of the boiler and the lowest point of the distributing main.

To return the water of condensation in the apparatus directly to the boiler under all conditions of pressure, the main pipes must be large enough to maintain the pressure of the boiler to within one pound in every part of the apparatus, and the water line of the boiler should be not less than four feet from the bottom of the horizontal main at its lowest part, though somewhat less difference in level can be used with safety, provided a less difference of pressure is carried between the flow and return mains.

**STEAM BOILERS.**—Boilers for steam warming should have few parts and be as simple in their construction as it is possible to make them. They should admit of easy access for cleaning and repairs, and be capable of evaporating as much water as the pipes can condense in equal times. The most economical size is a medium one, and a departure therefrom occasions a loss of effect, a very large or small boiler giving less duty for fuel consumed than a medium size

properly proportioned to the work to be done. Boilers are recommended that have the largest amount of direct fire surface with a minimum of indirect surface, as it is desirable in house heating to have slow combustion in order to reduce as much as possible the necessary attendance.

The form of boiler as illustrated on page 344 is specially commended as possessing the important features necessary for the economical generation of steam. It will be noticed that every part of its surface is in direct contact with the gases of combustion, while its proportion of heating surface to grate is larger than in any other form in general use, being 38 feet to 1 of grate, or 25 per cent. greater than in any other form now in the market.

**To Estimate Size of Boiler.**—For boilers of moderate heating surface, such as have been in general use for house warming, the ordinary method of estimating the size of boiler to be used has been, first, to obtain the amount of steam likely to be condensed by the radiating surface, and from this adapt the boiler accordingly.

Economy is, however, chiefly obtained by so proportioning the boiler that for every square foot of grate area there should be the largest practicable amount of heating surface over which the flame and smoke are to be passed and cooled on their way to the flue. It is obvious that the more nearly the gases are cooled to the actual temperature of the boiler before being ejected, the less heat is lost and the greatest number of heat units retained for each pound of coal burned.

It has been found by actual experiment that vertical tube radiators emit about  $2\frac{1}{2}$  heat units per square foot per hour for each degree difference between the temperatures of the pipe surface and the surrounding air; so that with pipe surface at 212 degrees and the air at 70, their difference in temperature would be 142 degrees. This, then, multiplied by the above  $2\frac{1}{2}$  units, gives an emission of 318 heat units per hour per square foot of surface.

There are approximately 1,000 heat units in a pound of steam, and hence each square foot of surface would condense about .31 lbs. of steam per hour.

In practice like the above, where the boiler surface is deficient and the products of combustion pass to the chimney at a higher temperature than they should, one square foot of boiler surface will evaporate approximately  $2\frac{1}{2}$  lbs. of water per hour, and  $2\frac{1}{2}$  lbs. divided by .31 gives a ratio of 1 square foot of boiler to about 8 square feet of radiating surface in the apparatus.

**Grate Surface.**—In house boilers, as usually constructed, where the above evaporation of  $2\frac{1}{2}$  lbs. of water to the square foot of boiler surface per hour is obtained, the ratio of surface to grate is about as 20 or 25 to 1; and estimating a coal consumption of say 8 lbs. per hour, with an approximate effect of 8 lbs. of water to each pound of coal, their evaporation per square foot of surface will be:  $8 \times 8 = 64 \div 25 = 2.6$  lbs. of water per square foot per hour.

In the "*Equator*" Boiler, as illustrated on page 344, an abrupt change from the old proportion of surface to grate has been made—the object being to obtain from the products of combustion as large an amount of heat produced by coal consumption as possible. For the purpose of comparison we will assume that the amount of coal to be consumed per square foot of grate per hour in this boiler is the same as in the above instance cited, viz., 8 lbs.

By the Equator boiler having the large proportion of surface to grate of about 38 to 1, it is obvious that while the temperature of the escaping gas into the flue will be lower, the actual number of units of heat absorbed by the whole average surface will be less per square foot.

The whole number of feet, however, being greater, the net saving is higher.

The result of this extension of boiler surface is to raise the evaporation from each pound of coal burned from 8 lbs. of water to 10—estimated at 212 degrees water to 212 steam.

Comparing this with the previous statement as to evaporation per square foot of surface per hour, we have  $8 \times 8 = 64 \div 25 = 2.6$ . The same reasoning with the Equator gives us:  $8 \times 10 = 80 \div 38$  is equal to 2.1 lbs. of water only per square foot of surface per hour.

By comparing these we have in the case of the ordinary boiler  $2.6 \times 25$  as against  $2.1 \times 38$ , giving 650 effective units retained by the ordinary boiler, as against 798 in the Equator, or *twenty-two per cent. saving*.

*The consumption of fuel* per square foot of grate, under conditions as usually found in private houses, with apparatus arranged to work automatically and run with an accumulation of ashes,

will be from five to eight pounds per hour, while with larger boilers fired regularly and with ordinary good draught, ten pounds will form a fair average.

*The chimney* must be capable of passing sufficient air for the largest consumption of fuel likely to be used, less air will not answer, while more will do no harm. Its area should be about 18 square inches for a boiler consuming each 12 lbs. of coal per hour, or about  $1\frac{1}{2}$  square inches per pound of coal consumed. An 8x12 chimney is the smallest that should be built in a house for a heating apparatus.

**Safety Valves.**—These should always be of sufficient area to allow the greatest quantity of steam ever likely to be formed to escape freely.

A formula for finding the size of safety valves is to divide the pounds of water evaporated per hour by 150 for required area of valve in square inches.

**Damper Regulators**, water feeders, gauge cocks, and other boiler attachments are so familiar and their uses so well understood and appreciated that further comment is not necessary here.

**MAIN STEAM PIPES, RISERS, Etc.**—Nearly all the success of an apparatus depends on its steam mains, their sizes and how they are run. They should always be of liberal dimensions, depending on the pressure of steam used and the extent of the surfaces employed. A low pressure gravity apparatus requires the largest pipes, though it may be stated that what will answer for such work will answer equally well for any other form of apparatus. The main steam pipe should be taken at once from top of boiler as high as may be convenient, so that its level may be as far above the water line of the boiler as possible. The main valve should be placed in its highest part, so that condensation may not find lodgement on either of its sides.

The pitch of a main steam pipe should drop slowly as it recedes from the boiler, say  $\frac{1}{2}$  inch in 10 feet, so that the steam and water may flow in the same direction. The return main should be pitched toward the boiler at about the same inclination.

All main steam pipes and steam risers should be connected at their lowest levels by relief pipes run to or connected with the main return pipes, or to the return risers below the water line in the boiler, to take from them any condensation that may be formed. These relief pipes also serve to equalize the pressure throughout the apparatus, or the return lines may be all run below the water line of the boiler, in which case the connecting lines spoken of are unnecessary.

From the main supply pipe, risers are taken and run to the several parts of the building to be warmed, provision being made between the floors, in placing outlets, for their due expansion. The mains should not be taken too near walls up which risers run, as scarcely anything can withstand the expansion of iron, which in 100 feet and heated to a temperature due to 100 pounds pressure amounts to 2.3 inches.

**The Steam Risers** should be large for low pressure steam. The general practice is to reduce one size for each floor, though they should never be less than  $\frac{3}{4}$  in.

**Return Risers** convey the condensation from the radiating surfaces in the various apartments to the return main pipe which communicates through a check valve (which may or may not be used) back to the boiler.

**Return Pipes** are usually run one size less than the feed pipes, and never less than  $\frac{3}{4}$  inch, nor less than  $\frac{1}{2}$  the diameter of the feed pipes. A thorough drainage of steam pipes may always be depended upon as a means of preventing cracking or pounding noises.

When *automatic air valves* are employed, a  $\frac{3}{8}$ -inch pipe should be arranged, with outlets to each floor, for connection to the radiating surfaces, and should extend to and connect with the sewer pipe outside of all traps.

There is no fixed rule for determining the sizes of pipes. In general practice, the area of the cross section of a 1 inch pipe—.7854 square inches—is taken as a unit in the rating of steam pipes,



and the area of a 1 inch pipe in the main at the boiler to each 100 square feet of heating surface, mains included, has been accepted by steam fitters as the result of best experience.

#### SIZES OF MAIN STEAM AND RETURN PIPES.

Radiating surface in square feet to be supplied.	Size of steam pipes.	Size of return pipes.
125.....	1 $\frac{1}{4}$	1
125 to 200.....	1 $\frac{1}{2}$	1 $\frac{1}{4}$
200 to 500.....	2	1 $\frac{1}{2}$
500 to 1000.....	2 $\frac{1}{2}$	2
1000 to 1500.....	3	2 $\frac{1}{2}$
1500 to 2500.....	3 $\frac{1}{2}$	3

When mains and surfaces are very much above the boiler, the pipes need not be as large as given above, under very favorable circumstances and conditions a 4 inch pipe may supply from 2,000 to 2,500 feet of surface, a 6 inch pipe for 5,000 feet, and a 10 inch pipe for 15,000 to 20,000 feet if the distance of run from boiler is not too great. Less than 1 $\frac{1}{2}$  inch pipe should not be used horizontally in a main unless for a single radiator connection. The return sizes named are large enough in ordinary pipe work, though when horizontal pipes with many fittings are used they should be of the same diameter as the steam pipes.

Generally, when condensation is returned to the boiler by gravity, the diameter of mains should be equal in inches to one-tenth of the square root of the radiating surfaces used in square feet; thus a 1 inch pipe will supply 100 square feet of surface, or with 900 square feet of surface the supply pipe should be.  $\sqrt{900} = 30 \div 10 = 3$ " diameter.

**The areas of pipes** increase rapidly with each increase of their diameters, circular pipes being to each other as the square of their diameters. When a pipe has its diameter doubled, its surface is likewise doubled, while its area is increased four-fold. The increase of the area of pipes for each inch of increase of their diameters is an arithmetical progression whose common difference is 2, the first term being 1.

A small pipe has very much greater surface, compared to the volume of steam or water contained, than a large one. Experiments have shown that the units of heat given off by a square foot of surface are for large diameter horizontal pipes (say 2 $\frac{1}{2}$ " to 4"), 1 $\frac{1}{4}$ , while in vertical tube radiators 2 $\frac{1}{4}$  units are emitted per hour per degree difference between the temperature of the pipe and the ambient air.

**Expansion and Contraction.**—Scarcely anything can withstand the expansion of iron. It expands from 32° to 212°, about  $\frac{1}{960}$  of its length, which in 100 feet equals 1 $\frac{3}{8}$  inches. The expanding power of a 2" pipe when heated to a temperature of 100 pounds steam, or to 338°, exerts a force sufficient to move 25 tons.

Cast iron expands  $\frac{1}{180000}$  of its length for each degree Fahr. it is subjected to within ordinary limits while in its solid state.

Wrought iron expands  $\frac{1}{154000}$  of its length for each degree Fahr. To find the expansion of a line of pipe, multiply its length in inches by the number of degrees of temperature applied and divide the product by 154,000 for required expansion in inches; thus  $100' \times 12" = 1200 \times 338^\circ = 405600 \div 154000 = 2.7$  inches.

Special attention, then, must be given to the expansion and contraction of pipes and allowance made for it. Pipes and branches must be unconfined, especially in the direction of their length.

*Expansion Joints* should not be used if the expansion can be compensated for in any other way. In private houses they can be avoided by making right angle turns, etc.

**RADIATORS** are made in a variety of forms and generally of wrought and cast iron. Their measure of efficiency, as transmitters of heat, is the weight of steam they will condense to water in equal times. From experiments and tests that have been made by experts of unquestioned character it has been proven beyond all question that radiators constructed of wrought iron tubes—possibly because of their thinness of metal as compared with that of cast iron surface—is very considerably the more efficient.

The *Nason form of Vertical Tube Radiator* was invented by Mr. Joseph Nason about 1860, and has been in constant service since that time, giving positive satisfaction under every condition possible to warming apparatus. They are still the leading and most efficient form of surface to be had. They are made in a large number of sizes and forms, as is shown on pages 353 to 370.

*Radiators* should be proportioned to the cooling surfaces in a building and to the quantity of fresh air admitted into an apartment for the purpose of ventilation. Heat has the remarkable property of passing through moderate thicknesses of air and gases without appreciable loss, so that air is not warmed by radiant heat but by contact with surfaces that have absorbed the radiation.

Table showing the powers of different substances for transmitting heat:

Window Glass.....	1000
Oak or Walnut.....	66
White Pine .....	80
Pitch Pine.....	100
Lath or Plaster... ..	75 to 100
Bricks, rough.....	200 to 250
Bricks, whitewashed.....	200
Granite or Slate .....	250
Sheet Iron.....	1030 to 1110

A square foot of glass will cool 1.279 cubic feet of air from the temperature inside to that outside per minute, and outside wall surface is generally estimated at one-fifth of the rate of glass in cooling effect.

It is very difficult to lay down a fixed rule for apportioning radiating surface to cubical contents of space, there are so many conditions of position and exposure which must be taken into consideration in determining relative proportions; and again, it is evident that the amount of surface necessary for a well constructed building would not be sufficient for a poorly constructed one.

The cubical contents of a room have but little to do with the surface required, still it may be considered a convenient factor for rough calculations, and the ordinary rule of thumb method, often used, is to take the product of the length, breadth and height to equal space contained; mark off the two last figures and call it square feet of surface required, adding for exposed or corner rooms 15 to 30 per cent. For low pressures—2 to 5 lbs.—as much as 100 per cent. is sometimes added, according to size and position of rooms and the purposes for which they are intended.

The following *formula for estimating surfaces* is recommended :

Add together the square feet of glass, plus the cubic feet of air required to be changed per minute, and one-twentieth of surface of outer walls. Multiply this sum by the difference between the temperature inside and outside of building, and divide the product by the difference between the temperature of the pipe surface and the required temperature of the air inside, for the surface required in square feet.

One square foot of surface will heat from 40 to 100 cubic feet of space to 75° in — 10° latitudes. This range is intended to meet conditions of exposed or corner rooms of buildings, and those less so as intermediate ones of a block. As a general rule, one square foot of surface will heat 70 cubic feet of air in outer or front rooms and 100 cubic feet in inner rooms. In large stores in cities with buildings on each side, 1 to 100 is ample.

Table of approximate proportions of radiating surfaces to cubic capacities to be heated.

One square foot radiating surface will heat	In dwellings, school rooms, offices, etc.	In halls, stores, lofts, factories, etc.	In churches, large auditoriums, etc.
By direct radiation.....	60 to 80'	75 to 100'	150 to 200'
By indirect radiation .....	40 to 50'	50 to 70'	100 to 140'

Isolated buildings exposed to prevailing north or west winds should have a generous addition made to the heating surface on their exposed sides.

The best positions for radiators are where most cooling is done,—before or under the windows or on the outside walls. Where there are many windows the surface should be divided into a number of radiators.

*Radiator Connections* are usually of the following size:

For 30 feet of surface,	Inlets should be	$\frac{3}{4}$ "	and Outlets	$\frac{3}{4}$ "
" 60	"	"	"	$\frac{3}{4}$ "
" 100	"	"	"	1
" 150	"	"	"	$1\frac{1}{4}$ "

When separate feed and return pipes are used on radiators, steam and return valves are necessary. These valves should never be half opened, and if possible they should be operated together. When operated separately, the return valve should be the first closed and the steam valve the first opened.

*Air Valves* are usually placed high up on one of the pipes nearest the return end of a radiator.

**VENTILATION.**—In the warming and ventilation of buildings, the entire process, whatever expedients may be adopted, is dependent upon the expansion and contraction of air; or, in other words, upon the fact that air which has been heated or expanded ascends, and air which has been deprived of heat or contracted descends.

Ventilation is the art of causing air to pass through any place for expelling impure air, or dissipating noxious gases or vapors, so that no portion of air shall be breathed twice in the same place. From every heated surface a current of heated air is constantly rising; and so all surfaces for warming should be placed as near as possible to the floor, since radiated heat has very little effect upon the air below the level of the surface from which it is projected.

An average person requires about one cubic foot of oxygen per minute, or say five cubic feet of common air for respiration.

Warmed fresh air flues should be in or near the outside walls, and foul air flues should be in the inner walls near the floor and ceiling, with register valves so as to use either or both, as necessary.

The velocity of air in heated flues with only natural draught rarely reaches 8 feet per second under any conditions, and 2, 4 and 5 feet respectively are fair averages of velocity for first, second and third floors of a house.

To find time for changing air in a room of known cubical contents through a flue of 1 square foot cross section, multiply the velocity of the air through the flue in feet per second by 60 and divide the product into the cubical space of the room; thus, with velocity of 5' per second equals 300 feet per minute, divided into cubical space of room, say 4,000 cubic feet, equals 13.3 minutes.

A natural current of air is from 2 to 5 feet per second. A 12" flue in a wall will deliver about 10,000 cubic feet of air in an hour on second floor of an ordinary building, and about one-half as much to the first floor, so that flues to first floor should be double the area of those intended for second floors.

The same cause which produces draught in chimneys will, if conditions be favorable, set in motion and discharge vitiated air from rooms. Air in chimneys when heated expands according to a law applicable to all gases— $\frac{1}{480}$  of its volume for each degree Fahr. from  $32^{\circ}$  to  $212^{\circ}$ ; thus, in a chimney 10' high, if the air is heated  $20^{\circ}$  it would be expanded in volume  $\frac{20}{480}$  of 10 feet or .416 feet in height, and as the velocity of any falling body is  $= \sqrt{2gh}$ , so the efflux of air is equal to 8 times the square root of the difference in the height of 2 columns of air of the same weight but of unequal densities, so  $8 \sqrt{.416} = 5.16$  feet per second or 310 feet per minute. Thus is ascertained the ascensional force of a chimney draught, or the velocity with which heated air is forced through a flue or chimney.

Ventilation is more difficult in summer than in winter, because the difference of two columns of equal weight is less in height, the difference in their temperatures being less, so that in summer the number or size of inlets and outlets must be increased and the same restricted in winter.

Tredgold advised making the spaces for admission of air abundantly large, and divided much as possible, aggregating to double the areas in ceiling for its exit.

Ventilation has by some been divided into two branches : plenum—forced by mechanical contrivances, and vacuum—the air is drawn out by mechanical means, or through the agency of heat artificially excited, while fresh air finds an entrance through channels adapted to the purpose.

*A well arranged apparatus* should be made to work at any pressure, and with its heating surface properly proportioned it can be made to meet the exigencies of fall, winter and spring weather by simply carrying a pressure suitable to the occasion.

No heating apparatus is perfect unless it heats thoroughly at all pressures, unless the water of condensation runs back and into the boiler at all pressures, unless it is noiseless under all common conditions, and requires only ordinary attention as to fire and water.

*Where a steam engine* is available and in daily use, the steam warming pipes of an apparatus may be supplied from the engine boiler, its dimensions requiring to be enlarged at the rate of one cubic foot for every 2,000 cubic feet of space to be heated to 70°. One square foot of boiler surface will supply 7 to 10 square feet of radiating surface, and each horse-power of boiler will supply from 240 to 360 lineal feet of 1-inch pipe, or from 80 to 120 square feet of surface.

*The rate of combustion* under boilers should not exceed .3 pound of coal per hour per square foot of boiler surface, except when quantity of steam is more important than economy of fuel. Allowing 15' boiler surface to a horse power, the fuel necessary per horse power would equal 4.5 pounds. With an evaporation effect of 8 pounds water per pound of coal, the evaporation per horse power would on this basis equal 36 pounds of water ; or divided by 15, each foot of boiler surface would equal 2.4 pounds of water evaporated.

*In steam heating by the expansion system*, or where steam is used expansively for heating, the steam is allowed to expand or blow through the pipes, and the quantity used in a given time must be sufficient to carry along the water of condensation which forms in the pipes during transmission.

When scattered buildings are heated from one source, or where boilers are of necessity placed on the level of the radiating surfaces, the expansion system must be employed and the condensation must be taken care of by steam traps. When it is desired to return this condensation to the boiler, we recommend the Return Trap, as shown on page 302 ; but when the condensation is allowed to waste, the Nason Trap as on pages 298 and 301 is by far the best form to be had, as it allows the water to cool to the lowest temperature before escaping. It is provided with a valve to hurry the circulation on starting the apparatus. Its action is intermittent, the frequency of discharge depending on the work it has to do.

*With high pressure steam* allowed to expand through a building and condense through traps, very much smaller piping will answer.

Very great waste of heat results from discharging into an open tank or into the atmosphere. Thus, one pound of steam requires about one thousand heat units, and same is given out in condensation. When water is pumped into a boiler at 40°, 140° additional heat units are required to raise it to the temperature of returned water, and this is saved in a gravity apparatus, resulting in a saving of over 12½ per cent. of fuel.

*To estimate pressure* in inches of mercury, multiply the apparent pressure by 2.0376 for inches of mercury above the atmosphere ; thus, 10 lbs.  $\times$  2.0376 = 20.376" of mercury. For absolute pressure add 30", equals 50.37'.

*To estimate volume of steam.* Add 430 to the temperature of the steam,  $\times$  76.5 and  $\div$  absolute pressure in inches of mercury ; thus, steam of 10 lbs. pressure has a tempt. equal to  $(240^\circ + 430) \times 76.5 \div 50.37 = 1017 =$  volume of steam compared to that of water at 39°.

*To estimate weight of a cubic foot of steam* at different pressures : Divide 1000 (weight in ounces of one cubic foot of water) by the volume for required weight in ounces ; thus, steam at 40 lbs. has volume of 489 ;  $1000 \div 489 = 2.05$  oz. = weight of a cubic foot of steam.

*To estimate the number of cubic feet of steam* a pound of water will produce at different pressures : Divide the weight of a cubic foot of steam in ounces into 16 for the required number ; thus, 1 cubic foot of steam at 20 pounds pressure has a weight of 1.373 and divided into 16 its weight equals 11.65 cubic feet of steam.

**Steam to heat water.**—To estimate the quantity of steam required to raise the temperature of water any given number of degrees, subtract the lowest temperature of the water from the required temperature and divide the remainder by 1146, minus the required temperature of the water; thus, to find the weight of steam necessary to raise the temperature of water from 75° to 190°:  $190 - 75 = 115 \div (1146 - 190 = 957) = .12$ , or 12 per cent. of the weight of the water to be raised in steam.

To find the weight of water a given weight of steam will heat, proceed as above after transposing the divisor and dividend; *i. e.*, divide 957 by 115 = 8.32 times the weight of the steam will be raised 115°.

## HOT WATER HEATING.

**THEORY OF CIRCULATION.**—That all falling bodies gravitate with the same velocity and therefore descend through a certain definite space in a given time is an effect of which gravity is the cause; by it the circulation of hot water is attained. This circulation causes all the water in an apparatus to pass successively through the Boiler and then communicates the heat received to the various apartments to be warmed.

*In an apparatus for warming* when heat is applied to a Boiler the water becomes lighter, and the water in the lower or return pipe of the apparatus being colder and heavier presses with a greater weight than in the Boiler.

By means of this unequal pressure in the lower pipe the water is forced to circulate through the apparatus, and it will continue to do so as long as the water in the returns have a lower temperature than that in the Boiler and flow pipes, and as one is continually receiving heat while the other is as constantly parting with it an equality of temperature never can occur; if it did the circulation would cease. So we find the circulation of water in an apparatus is caused by the unequal pressure in the “up” and “down” pipes, and is not the result of any alteration in the level of the water contained.

A greater permanence of temperature may be obtained by hot water than by any other method, and it is also superior in its economy of fuel.

The relative weight of steam and water at 212°, are about as 1 is to 1,640. So that a pipe filled with water at 212° contains 1,640 times the matter that it does when filled with steam. When the temperature of the steam falls below 212° condensation begins and continues until all its latent heat is abstracted, it then contains a heating power of an equal bulk of water or as quantity occupying  $\frac{1}{1640}$  part of space the steam did. The specific heat of steam as compared to that of water is for equal weights as .305 is to 1. Taking the latent heat of steam at 966° the relative heat from equal weights of condensed steam and water by reducing their temperatures from 212° to 60° is as 7.355 is to 1, but for equal bulks it will be as 1 for steam to 280 for water; therefore, steam will lose as much heat in 1 minute as the same bulk of water will lose in  $4\frac{2}{3}$  hours.

The colder the water in the descending pipes as compared with that in the boiler, the more rapid will be the circulation through the pipes.

*The gravitating force* of an apparatus is inversely proportioned to the temperature; that is, it is less as the temperature is greater.

Provision must be made for the escape of air in the pipes, else no circulation can be had. Water while boiling evolves air, and when cooling it imbibes it again; and as air is lighter than water, it lodges in the high parts of the circulating pipes, and allowance must be made for its escape or for carrying it off.

*With closed boilers*, pipes may be carried to any height, depending only on the strength of the material employed. The higher the ascending and descending pipes are run, the more rapid will be the motion of the water, because of the greater difference in their weights.

*The pressure by water* is calculated by its columnar height reckoned from the bottom of the vessel, and this pressure on each square inch of surface increases at the rate of about .43 pounds for every foot of perpendicular height.

Neither the principal nor practical working of an apparatus is in the least affected by having any additional pipes leading into or out of the boiler. The effect is the same with more flows than returns, and conversely.

Increasing the number of vertical branches does not increase the pressure in an apparatus if the vertical height is not increased.

**Law of Velocity of Flow.**—The motive power of the circulation in a hot water apparatus is the difference between the specific gravities of the ascending and the descending pipes. This effective pressure is very small, and is equal to about .73 grains for each foot in height for each degree difference between the pipes; thus, with a height of 12" in "up" pipe and a difference between the temperatures of the up and down pipes of 8°, the difference in their specific gravities is equal to 5.84 grains on each square inch of the section of return pipe, and the velocity of the circulation is proportioned to these differences in temperature and height.

*To Calculate Velocity of Flow.*—Thus, with a height of ascending pipe equal to 10' and a difference in temperatures of the flow and return pipes of 8°, the difference in their specific gravities will equal 58.4 grains, or  $\div 7000 = .008343$  lbs., or  $\times 2.31$  (feet of water in one pound) = .0193 feet, and by the law of falling bodies the velocity will be equal to  $8 \sqrt{.0193} = 1.116$  feet per second, or  $\times 60 = 66.9$  feet per minute. In this calculation the effect of friction is entirely omitted. Considerable deduction must be made on this account. Even in apparatus where length of pipe is not great, and with pipes of larger areas and with few bends or angles, a large deduction for friction must be made from the theoretical velocity, while in large and complex apparatus with small head, the velocity is so much reduced by friction that sometimes as much as from 50 to 90 per cent. must be deducted to obtain the true rate of circulation.

*Velocity Modified by Areas of Pipe.*—The motive power of the circulation increases with the size of pipe; that in 4" being more than 4 times that in 2", which is the relation of their areas, but as areas increase faster than circumferences the larger the pipes the less their relative resistance.

Friction of water in pipes varies according to their arrangement and size, being much greater in small than in large pipes, because of greater surface the water contained is in contact with and its increased circulation on account of its more rapid cooling. By increasing velocity the friction is increased nearly as the square of the velocity.

Water loses less of its heat in small than in large pipes, since it travels more rapidly, and the loss of heat by water is directly as the time and the surface conjointly.

**To Increase Activity of Circulation.**—There are two ways of increasing the effective or motive power, viz., by causing water to cool a greater number of degrees by transit through greater length of pipe or by exposing it to more surface in proportion to water contained in pipes, and second, by increasing the vertical height; this last is principally depended upon when additional power is required to overcome obstructions.

If the circulation be doubled in velocity, the water will pass through the same length in half the time and lose only one-half as much heat, because the rate of cooling is not proportioned to the distance through which water circulates, but to the time of transit.

Increased velocity is indicative of increased power, and in hot water apparatus it is increased velocity which overcomes unusual obstructions.

Care must be taken in arranging pipes so that water in its descent may not be obstructed by differences of level or angles where air may accumulate, for this effectually prevents circulation by dividing the streams.

*Friction increases* with velocity, but the latter is checked by friction, and so a mean rate is assumed.

**Flow Pipes.**—All the flow pipes in an apparatus should have an upward pitch toward the heaters and the return pipes a downward one toward the boiler, in either case about 1 inch in 20 feet will answer.

*Pressure in pipes* does not aid circulation, because the back pressure always equals the pressure ahead.



Since difference in the temperatures of the two columns is essential, the water should rise as much as possible directly it leaves the boiler while it is hottest and lightest, and do most of its falling just before entering the boiler, when coldest and heaviest; and as the motive power at best is small, every advantage should be taken of it. Flow pipes should be covered to retain heat to point where they are to be used. With the return pipe it is equally important, as any loss of heat at this point reduces the temperature of the water entering the boiler.

The advantage of conveying the water through ascending pipes from boilers is two-fold. It allows the freest escape for the air and steam, which prevent circulation, and also facilitates the circulation by increasing the actual and relative weight of the descending column.

**Horizontal Pipe.**—The distance through which water will circulate in an apparatus is very considerable; the limit has not been ascertained, as the higher it rises above the boiler the greater distance it will circulate. Generally it is best to shorten circulations, and an apparatus will be more efficient if run through two or more short than through one long circulation; for while impediments are overcome by considerable differences in temperatures, the apparatus is most satisfactory when they do not differ widely.

When a boiler is placed considerably below the pipes and other surfaces the circulation is sure to be rapid, and the circulation should be as short as possible to have but little difference in temperature of flow and return pipes; but when boiler is placed nearly on the level of the pipes it is often necessary to have greater differences in the temperatures, so as to secure a good circulation.

Horizontal leading pipes require to be much larger in proportion to their branches than is necessary with vertical leading or main flow pipes, because the friction in an upward pipe is exceeding small.

Frequently pipes branching from an upright are required to circulate at different levels, as in the warming of several floors, then either one of two methods may be adopted. First, the mains are run to the highest level, and passing round such room descend to and circulate through each of the lower floors in turn, finally returning to the boiler; or each floor may have a separate range of pipes branching out of a main upright supply. By the first method the upper floors receive most of the heat, while the lower ones warm slowly. In the second method, if the laterals are taken at right angles from the upright main, the whole of the water is apt to rise to the upper floor, because of the rapidity with which water circulates in an upright pipe. This may be obviated by arranging checks or valves at the points of the lateral branches, or each floor may have a separate supply pipe rising directly from the boiler to each floor.

**Surface in Boilers.**—The extent of surface which a boiler should expose to the fire should be proportional to the quantity of pipe to be heated, and a small apparatus should have more surface of boiler in proportion to length of pipe than a larger one, as the fire is less intense and burns to less advantage in a small furnace than in a large one.

It is more economical to work with larger surface of boiler at moderate heat than to keep the boiler at its maximum temperature.

Boilers for hot water apparatus should expose the largest surface to the fire in the smallest space.

They should so effectually absorb the heat from the fuel that as little as possible may escape by the chimney.

They should allow the freest circulation of water throughout their entire extent.

They should not easily get out of order, nor rapidly deteriorate by continued use.

**The Nason Boiler.**—As meeting all the requirements of a first-class Hot Water Boiler, special attention is directed to the "Gulf Stream" Boiler as illustrated and described on page 348. These are efficient, durable, and being provided with large fire surface, they are unusually economical in their consumption of fuel. The heating surface is so disposed that a large proportion of it is exposed directly to the fire, and the heat developed by combustion is thus more thoroughly absorbed than in any other form of boiler now on the market.



The best forms of heating boilers are proportioned about as follows :

1	square	foot	of	grate	surface	to	about	40	square	feet	of	boiler	surface.
1	"	"		boiler	"	"	5	"	"			radiating	"
1	"	"		grate	"	"	200	"	"			"	"

**Grates**—In furnaces of considerable dimensions the fuel can be made to burn a much longer period without attention, as so intense a fire is not required as with a steam boiler, and when properly constructed they ought to burn for ten hours without replenishing.

The size of grate should be proportioned to the surface which radiates heat in a building.

**Combustion.**—The consumption of fuel on any given area of grate must depend on the rapidity of the draught.

In ordinary house-heating boilers, one square foot of grate will burn from 5 to 8 pounds of coal per hour, depending on the work to be done, and may be depended upon to supply requisite heat to about 175 to 200 feet of radiating surface.

*Chimneys* require an area of about 1.5 square inches per pound of coal consumed per hour, or for boiler burning say 12 pounds of coal per hour, the area of chimney should be not less than 18 square inches.

*Efficiency.*—One pound of coal should add about 9,000 heat units to water in a boiler used for heating purposes.

The quantity of heat obtainable by the combustion of any substance is fixed and determinate, depending upon the chemical composition of the substance ; this cannot be exceeded, however advantageously applied. It is also true that in no boiler yet made is it possible to render available the whole of the heat of the fuel, and the ratio as above stated is all that can be absorbed in general house-heating boilers.

*Of the several formulae* which have been published for establishing the amount of surface necessary to warm a given volume, there is probably no more accurate method of getting at the result than that given by Hood, who works on the basis of the number of cubic feet of air which the radiation from the walls and windows in an apartment will cool per minute, added to the air necessary for ventilation.

The specific heat of water being 1 and that of air .238, and taking water as 800 times heavier than air, at equal volumes 1 cubic foot of water in losing 1 degree of its heat will raise the temperature of  $\frac{800}{.238} = 3361$  cubic feet of air 1 degree.

He has found by experiment that 1 square foot of glass will cool 1.279 cubic feet of air as many degrees per minute as the temperature inside exceeds the external temperature. He further finds that the radiation of external walls in the building gives only about one-twentieth the above loss by radiation.

He also states that water contained in iron pipe, with its temperature 146.8 degrees above that of surrounding air, will lose 1 degree per minute of its temperature, and that 1 square foot of radiating surface, theoretically, will heat, with 146.8 degrees of temperature above that of the surrounding air, about 250 cubic feet of air per minute.

Bearing these facts in mind, his formula for estimating the surface necessary to heat any given room is, to ascertain, first: The number of square feet of window surface. Multiply this by 1.279. Second—Ascertain the amount of cooling wall surface. Multiply this by 1.279, divided by 20. Then the sum of these two figures will give the number of cubic feet of air which have to be heated as many degrees per minute as the temperature inside exceeds that without.

To this should then be added the number of cubic feet of air required for ventilation for each occupant of the room—which should not be less than 5 cubic feet per minute for each individual.

Having thus obtained the number of cubic feet of air to be heated, the method of ascertaining the amount of surface necessary to warm it is as follows:

Multiply 146.8 by the difference between the required temperature of the building and that of the external temperature: dividing this product by the difference between the temperature of the

radiating surface and the required temperature of the building. This result multiplied by the cubic feet of air to be warmed per minute and then divided by 250 will give the required feet of surface necessary to obtain the temperature desired.

As an instance, we will take a room 10 feet cube, having two windows in it. each containing 18 square feet of glass, or 36' together; and two sides of the room are to be exposed to exterior cooling influence; or  $200'-36' = 164'$  of cooling wall surface, we now have  $36' \times 1.279 = 46$

feet. Again  $\frac{164 \times 1.279}{20} = 8$  feet, making  $46 + 8 = 54$  cubic feet of air to be heated. To this

we will add 5 cubic feet of air per minute for, say, 2 people = 10 feet, which, added to our 54, gives us 64 cubic feet of air per minute as the whole quantity to be heated.

We will assume that the temperature of the outside air is zero ; the desired temperature of the room 70°, and the temperature of the heating surface 200 degrees. From Hood's formula for

heating air we have then :  $\frac{146.8^{\circ} \times 70^{\circ}}{200^{\circ} - 70^{\circ}} \times \frac{64}{250} = 20$  square feet heating surface, or a ratio of 1

square foot of heating surface to 50 cubic feet of volume; which is evidently a fair approximation.

Until the air of a building is heated to its maximum temperature the glass surface will cool proportionately less air, as the cooling power of the glass is in exact proportion to the difference between the internal and external temperatures.

One square foot of plate or pipe surface at 200° will heat from 40 to 100 cubic feet of enclosed space to 70°—when extreme depression of temperature is—10°. This range is to meet conditions of exposed or corner rooms or buildings and of those less so. When air is constantly changed as for ventilation these proportions must be increased.

APPROXIMATE PROPORTIONS OF RADIATING SURFACES TO CUBIC CAPACITIES OF SPACE TO BE HEATED.

One Square Foot of Radiating Surface will heat with	In Dwellings, School Rooms, Offices, Etc.	In Halls, Stores, Lofts, Factories, Etc.	In Churches, Large Auditoriums, Etc.
High Temperature Direct Hot Water Radiation.. }	50 to 70 cubic feet.	65 to 90 cubic feet.	130 to 180 cubic feet.
Low Temperature Direct Hot Water Radiation.. }	30 to 50 " "	35 to 65 " "	70 to 130 " "
High Temperature Indirect Hot Water Radiation... }	30 to 60 " "	35 to 75 " "	70 to 150 " "
Low Temperature Indirect Hot Water Radiation... }	20 to 40 " "	25 to 50 " "	50 to 100 " "

The above proportions will give a temperature in the buildings described of 70° Fahr., thermometer being at zero in outside atmosphere.

Small rooms, rooms with large window surfaces, and with exposed walls and cold aspects, and unusually thick walls and fire-proof tile ceilings and floors, will require more radiating surface in proportion to space than is ordinarily needed. Frame buildings require more surface than brick buildings.

There is no advantage gained in using boilers containing a larger quantity of water than is required for the work to be done. The boilers are always full, the lower pipe bringing the supply of cooled water as fast as the ascending pipe carries off the warmed water.

When the water in an apparatus has been raised to the temperature at which it is desired to run it, no more fuel is necessary to maintain it at this point if the boiler, circulating mains and radiators contain a large volume, than if a small quantity.

It is desirable, however, that the cubic feet of water in an apparatus should be small, for the reason that in first heating it more fuel is required to bring it up to the desired point, and in cooling, an excess of heat may have to be used before the temperature falls to where it is wanted.

All radiators should be placed as near the cooling surfaces—the windows and outer walls—as possible, to prevent currents of cool air across the floors. The kind of radiator is not important, provided proper provision is made for the expulsion of all the air and for free circulation of the water. Wrought iron pipe coils are considerably more effective than cast iron radiators, though not so convenient for use in residences. For the latter cast iron radiators are recommended.

**Valves and Connections.**—Every radiator or coil should be provided with a valve, which may be placed either on the flow or return pipe, for controlling the circulation and regulating the amount of heat given out.

All radiator and other valves in the circulating system should be “Gate” or similar valves, having full openings to permit the free passage of the water.

Air cocks must be placed at the highest point on all radiators or coils to permit of the escape of air when the system is filled, or the admission of air when the system is to be emptied.

#### SIZES FOR RADIATOR CONNECTIONS.

1"	will supply a radiator containing	50 square feet of surface.
1 1/4"	“ “ “ “	125 “ “
1 1/2"	“ “ “ “	250 “ “
2"	“ “ “ “	400 “ “

**Sizes of Mains.**—All piping should be laid out with reference to the free passage of the water in the pipes, which will be aided largely by the use of “Y’s,” 45°s and long bends, instead of elbows, tees, etc.

Friction in the pipes hinders circulation, and for this reason no smaller pipes than 3/4" should be used.

Main flow pipes from the heater, from which branches may be taken, are to be preferred to the practice of taking off nearly as many pipes from the heater as there are radiators to supply.

It is not necessary that the main flow and return pipes should equal in capacity that of all their branches. The hottest water will seek the highest level, while gravity will cause an even distribution of the heated water if the surface is properly proportioned.

It is good practice to reduce the size of the vertical mains as they ascend, provided they are connected to radiators just below where each reduction is made.

As with steam, so with hot water, the pipes must be unconfined to allow for consequent expansion of the pipes on having their temperatures increased.

An expansion tank is required to keep the apparatus filled with water, which latter expands 1/4 of its bulk on being heated from 40° to 212°, and the cistern must have capacity to hold certainly this increased bulk. It is recommended that the supply cistern be placed on level with or above the highest pipes of the apparatus, in order to receive the air which collects in the mains and radiators, and capable of holding at least 1/20 of the water in the entire apparatus.

**There are two distinct forms or modifications** of hot water apparatus, depending upon the temperature of the water.

In the first or open tank system the water is never above 212° temperature, and rarely above 200°. This method always gives satisfaction where the surface is sufficiently liberal, but in making it so its cost is considerably greater than that for a steam heating apparatus.

In the second method, sometimes called (erroneously) high pressure hot water heating, or the closed system apparatus.

This form need not be high pressure. For ordinary steam heating a higher pressure than 10 lbs. is rarely used, and with no thought of danger. In a hot water apparatus with closed system and with a safety valve set to discharge at a pressure of 10 lbs. on the expansion tank, there would be no kind of danger to be feared; its temperature would be about the same as with 10 lbs. steam, and the surfaces of boiler and radiators and other proportions would not require to be any larger nor more costly than a steam apparatus, while it would be quite as effective.

"Thermus," in a recent issue of the *Engineering and Building Record*, says: "In a hot water apparatus up to 212° we may say we have no pressure, being only under the pressure of the atmosphere without, thus made equal. The power to burst things commences at the atmospheric pressure and counts therefrom. Therefore, up to 212° the walls of an apparatus are not strained; beyond this, to increase temperature we must increase the pressure, and must have a closed tank for compressed air or steam or a head of water equal to the pressure desired. Up to 300° the pressure is not dangerous, as with properly proportioned tank the pressure cannot exceed 52 lbs.; beyond 300° the pressure advances rapidly."

There are in a winter season seldom more than eight or ten days when the temperature descends to below zero, and at such times an apparatus suitable for ordinary weather can by means of a moderate increase in the temperature of its water and pressure (say up to 10 lbs.) be made to meet the requirements of increased heat that may temporarily be needed. It is indeed strange, in view of the above statements, known to all engineers familiar with house warming, that there should exist such an aversion to this closed tank system. We have erected a large number of such during the past thirty years, and have yet to meet with a first complaint as to its satisfactory service.

Water that has been boiled freezes sooner than water that has not been boiled.

When salt water is used in an apparatus the effect produced on cast or wrought iron pipes and boilers by 10 per cent. of salt in solution would not be of much importance, although in process of time the apparatus would corrode in some degree. After an apparatus is once filled with salt water any waste that occurs should be replaced by fresh water.

The larger the quantity of salt in water the greater is the degree of cold required to freeze it. Water containing 3 per cent. of salt in solution congeals at 28°, with 6 per cent. at 25.5°, and with 11 per cent. it would freeze at 21½°.

Water at medium temperature can hold in solution nearly 36 per cent. of common salt, and at its boiling point nearly 40 per cent.

Water will receive heat from iron 2.6 times as rapidly as iron will receive it from the fire.

## AIR.

Atmospheric air is a mechanical mixture—not chemically combined—and when in its purest state consists of oxygen 20.96 nitrogen 79 and carbonic acid gas .04.

One cubic foot at temperature of 32° Fahr. under a pressure of 14.7 lbs. or 30" of mercury, weighs 565.1 grains or .0807 lbs., and 1 lb. is equal to 12.387 cubic feet. Its weight varies about 1 grain for each degree of heat. It is 775 times lighter than water at 32° Fahr.

The mean weight of a column one foot square and of an altitude equal to the height of the atmosphere weighs 2124.7 lbs., or  $\div 144 = 14.7$  lbs. per square inch, or  $\div 62.5$  it will support a column of water about 34 feet high, or  $\div 846$  lbs. (weight of 1 cubic foot of mercury), it will support a column of mercury 30 inches high.

The vital element in air is oxygen gas, which is remarkable for its wonderful energy, and requires nearly 4 times its weight of nitrogen to dilute it sufficiently to meet the requirements of life. The volume of oxygen in equal bulks of air varies with its temperature; thus dry air at 85° contains 10 per cent. less than at 32°, and when saturated with vapor the difference is 12 per cent.; so that if in winter 1500 feet of air are required, in summer 1650 feet will be necessary to supply the same quantity of oxygen. An average man requires about 1 cubic foot of oxygen per minute for respiration, and this quantity is contained in about 5 cubic feet of common air.

The motions of air and all gases are precisely alike to those of fluids.

The temperature of the air at the surface of the earth varies with the geographical position, local circumstances, and with the height above the sea level. The influence of elevation above the sea is very considerable, varying with the climate, season, and general contour of the ground.

When the slope is gradual the cold produced is about  $1^{\circ}$  for 430 feet; on steep mountain slopes  $1^{\circ}$  in about 355 feet, and in balloon ascensions  $1^{\circ}$  in about 330 feet.

The temperature of the surface of the ground follows closely that of the air, but at a certain depth there is a stratum the temperature of which is invariable throughout the year, and is equal to the mean temperature of the air at that place. Below this the heat increases about  $1^{\circ}$  for every 58 feet of depth; so that if at the surface the temperature is  $62^{\circ}$ , water would boil at  $212^{\circ} - 62^{\circ} \times 58 = 8700$  feet, or  $\div 5280$  at 1.647 miles.

The rate of expansion of air and all other elastic fluids for all temperatures and densities is essentially uniform; from  $32^{\circ}$  to  $212^{\circ}$  or  $180^{\circ}$  they expand from 1000 to  $1376 = .00209$ , or  $\frac{1}{479}$  part of their bulk or volume for each degree, and from  $212^{\circ}$  to  $680^{\circ}$  they increase in volume from 1376 to 2322, or .00202 per degree.

The specific heat of air under 30" of mercury with constant pressure is .238, water being 1.00. When heated with constant volume, the pressure is increased and the specific heat is less than when expansion is permitted.

The ratio of specific heat under constant pressure to that under constant volume is as 1.421 is to 1, and the specific heat under constant volume equals  $\frac{238}{1.421}$ , or .1674 with Bar. 30". All gases are practically the same.

#### VARIATIONS IN SPECIFIC HEAT OF AIR AT DIFFERENT DENSITIES.

Mercury. column in inches.	Relative density.	Specific heat of equal volume.	Specific heat per lb. constant pressure.	Specific heat per lb. constant volume.	Cubic feet of air in 1 lb. at $62^{\circ}$
120	4	.476	.119	.0837	3.275
60	2	.336	.168	.1184	6.55
30	1	.238	.238	.1674	13.1
15	$\frac{1}{2}$	.168	.336	.2367	26.2
7.5	$\frac{1}{4}$	.119	.476	.3348	52.4

The specific heat for equal volumes (that at 30" being 1) appears to vary directly as the square root of the pressure in relative densities.

When pressure is not constant the volume of any gas varies as the inverse ratio of the pressure, the temperature being constant; thus, 1 cubic foot of air has pressure of air on it to begin with,

and under 45 lbs. its volume equals  $1 \times \frac{15}{15+45} = .25$  cubic foot. When temperature and pressure

are different the rule for expansion of gases is:  $V' = V \times \frac{P}{P'} \times \frac{458.4 + T'}{458.4 + T}$  in which V, P, T,

equals volume, pressure, and temperature in one case, and V' P' T' the same in another case; thus, 10 cubic feet of air at ordinary pressure and temperature of  $60^{\circ}$ , would, if heated to  $200^{\circ}$

under 40 lbs., become  $10 \times \frac{15}{55} \times \frac{458.4 + 200}{458.4 + 60} = 3.7$  cubic feet. Air at  $32^{\circ}$  heated to  $212^{\circ}$ , or  $180^{\circ}$

becomes  $1 \times \frac{458.4 + 212}{458.4 + 32} \times \frac{670}{490} = 1.367$  cubic feet, while experiment shows expansion = 1.375.

**Efflux of Compressed Air, etc.**—Theoretically, when water or other liquid escape from an orifice into air its velocity of efflux is equal to that of a body falling through the space between surface and the orifice, but this result is greatly modified by shape of the orifice and friction.

**Velocity into a Vacuum.**—The density of air diminishes as it leaves the earth, but assuming it has the same density as at the earth with Bar. 30", to equal which a homogeneous column of

air would be  $\frac{30'' \times 13.59}{.00122 \times 12} = 27838$  feet, or  $30'' \times 13.59 \times 819 = 333906'' \div 12 = 27825'$ , and by rule of falling bodies equals  $8 \sqrt{27838} = 1344'$  per second. This is theoretical only. In practice it is largely governed by friction through the pipe and orifice and the area of both.

### STEAM.

*Steam* is pure water expanded by heat into an invisible vapor. Perfect steam is in no way moist, but is as dry as are the permanent gases. It has in a complete degree those properties of fluidity, mobility, elasticity and equality of pressure, in every direction that distinguishes gases.

Saturated steam is the normal condition of steam generated in free contact with water, and same density and same pressure always exist in conjunction with same temperature. It therefore is at both its condensing and generating points, *i. e.*, it is condensed if its temperature is reduced and more water is evaporated if its temperature is raised.

The pressure and density of steam, generated in free contact with water, rise with the temperature and reciprocally its temperature rises with the pressure and density, the higher the temperature the more rapidly the pressure advances. There is but one and a corresponding pressure and density for each temperature. The variations in pressure and density of steam generated in free contact with water are exactly proportionate to the variations of temperature. Under this condition steam is termed "saturated" from its containing the largest amount of water possible at any given temperature.

The pressure of steam at a boiling point of  $212^{\circ}$  is equal to the pressure of the atmosphere, which is 14.7 lbs. upon a square inch.

The expansive force of the vapor of all fluids is the same at their boiling points.

A cubic inch of water evaporated under ordinary atmospheric pressure is converted into 1,640 cubic inches of steam, or nearly 1 cubic foot, and it exerts a mechanical force equal to raising  $14.7 \times 144 = 2,120$  lbs. 1 foot high.

One lb. pressure of steam will support a column of mercury = 2.0376 inches high.

The boiling point of water varies with the pressure of the atmosphere or vapor, under which it is effected.

Steam for heating purposes possesses an advantage over hot water in the ease of its application where great inequalities and frequent alterations of level occur, and particularly when the boiler must be placed higher than the place to be heated. For buildings occupied at intervals steam is more effective than hot water in its rapid generation of heat.

The most prominent of the properties of steam are its high expansive force, its condensation by the abstraction of its temperature, its concealed or undeveloped heat, and the inverted ratio of its pressure to the space it occupies.

The expansive force of steam arises from the absence of cohesion between and among the particles of water. If a known volume of steam of a certain pressure be made to occupy but one-half of its volume its elastic power will be doubled.

Steam has an expanding force always equal to the pressure under which it is generated, and its temperature theoretically is always the same as that of the water in contact with it.

The sum of its sensible and latent heat is always the same and is equal to  $1146^{\circ}$  above the freezing point of water.

Under ordinary atmospheric pressure 26.36 cubic feet weigh one pound, and it has a gravity about equal to one-half that of air at  $34^{\circ}$ , but if the temperature of air be increased  $160^{\circ}$ , the gravity of steam will equal two-thirds of the weight of air. This fact is further alluded to on page 355, being illustrated by the circulation of steam in a Nason Radiator Pipe.

### HEAT.

*Heat* is simply a mode of motion, or an influence by which motion is produced among the atoms of substances. This motion is imperceptible, heat being detected only by a sense of feeling.

It is a universal force and is referred to as cause and effect. Heat and cold are conditions and not substances. They are relatively, not absolutely, different, being merely higher or lower degrees of heat.

The three most apparent effects of heat, so far as they relate to the form and dimension of bodies, are expansion, liquefaction, and vaporization. Its effect is most evident in those bodies which are the least influenced by the attraction of cohesion; thus in solids it is comparatively trifling, in liquids it is much greater, while in gases it is very considerable.

The force with which bodies expand and contract under the influence of an increase or diminution of heat is irresistible, and is one of the greatest forces in nature.

The ratio of expansion in solids and liquids increases with the temperature, while in gases it is sensibly uniform at all temperatures.

*A unit of heat* is the quantity of heat necessary to raise 1 lb. of water  $1^{\circ}$  F.

*Specific heat* is the capacity of a body for heat, and is the number of heat units necessary to raise 1 lb. of any substance  $1^{\circ}$ . The specific heat of all bodies, except gases, increases with their temperature.

*Latent heat* is the number of heat units absorbed by any body in passing from a solid state to a liquid, or from a liquid to a gaseous condition.

*Heat is transmitted or lost—*

By radiation—projected in rays and in straight lines.

By convection—rising in fluid masses or through flues.

By conduction—passing from one body to another in contact.

The heat necessary to warm a pound of water  $1^{\circ}$  will warm about  $4\frac{2}{10}$  lbs. of air  $1^{\circ}$ , or  $2\frac{1}{10}$  lbs. of vapor of water, or 9 lbs. of iron, or nearly 2 lbs. of ice, one degree. The heat necessary to convert 1 lb. of water from  $178^{\circ}$  (which is about the temperature of return water) to steam is about 1000 units, and this will heat 52,000 cubic feet of air  $1^{\circ}$ , or 5,200 cubic feet  $10^{\circ}$ , or 52 feet  $100^{\circ}$ , without making allowance for the increase of its bulk because of expansion, which for a difference of  $100^{\circ}$  will equal nearly 20 per cent. of its original bulk.

## WATER.

Whether as a solid, liquid, or gas, water is one of the most wonderful substances in nature. At all temperatures above  $32^{\circ}$  F. the motion of heat is sufficient to keep its molecules from rigid union; but at  $32^{\circ}$  the motion becomes so reduced that the atoms seize upon each other and aggregate to a solid.

It is composed by a chemical union of oxygen and hydrogen in the proportions of :

By weight, oxygen, 88.9 parts. Hydrogen, 11.1 parts.

By volume, “ 1 “ “ 2 “

Liquids transmit pressure equally in all directions, unchanged and without loss of power. This equality of pressure is their most characteristic property.

Water when heated from  $40^{\circ}$ —which is nearly the temperature when at its maximum density—to  $212^{\circ}$ , expands .0433 times its volume, or .000252 of its bulk for each degree, making its increase for  $180^{\circ}$  equal to 1 cubic foot in 21.41 feet. Below  $39.1^{\circ}$ , its point of maximum density, its ratio of expansion decreases at first slowly, but progresses rapidly to the point of congelation, where it suddenly expands .0855 of its volume; a cubic foot of ice weighing 57.5 lbs., or about 5 lbs. less than when at  $40^{\circ}$  temperature. At  $46^{\circ}$  it has about the same volume as at  $32^{\circ}$ .

It is compressible at the rate of about  $\frac{1}{21740}$ , or about  $\frac{1}{100}$  of an inch in  $18\frac{1}{10}$  feet by each atmosphere or pressure of 15 lbs. per square inch. When the pressure is removed its elasticity restores its original bulk. By compression, Mr. Perkins, of London, required a pressure of 15,000 lbs. to reduce water  $\frac{1}{4}$ th part of its volume. Water at  $39.1^{\circ}$  is taken as the unit of weight upon which the specific gravity of steam is based.

A United States standard gallon at  $39.1^{\circ}$  Fah., Barometer at 30" mercury, weighs 8.34 pounds, and is equal to 231 cubic inches.



A pound of distilled water at  $39.83^{\circ}$ , Bar. 30", is equal to 27.7 cubic inches, and a cubic inch weighs 252.69 grains. A cubic foot contains 7.48 gallons, and at  $39.83^{\circ}$  weighs 998 ounces or 62.38 lbs. avoirdupois, and is 828 times heavier than atmospheric air. For ease of calculation its weight is taken as 1,000 ounces or 62.5 lbs.

Water at 1,000 ounces is assumed as unity in the comparison of gravity of different substances.

It evaporates at all temperatures, dissolves more substances than any other agent, and has a greater capacity for heat than any other known substance except hydrogen gas.

Twenty volumes of water absorb one volume of air under atmospheric pressure.

A miner's inch is a measure for the flow of water, and is an opening 1" square through a plank 2" thick under a head of 6" of water to the upper edge of the opening. It will discharge  $11\frac{5}{8}$  gallons in one minute.

A cylinder  $3\frac{1}{2}$  inches in diameter and 6 inches high will hold almost exactly one quart, and one 7 inches in diameter and 6 inches high will hold very nearly one gallon.

The ratio of fresh water to salt water is about as is 36 to 35 by weight.

**HYDRAULICS.**—The science of Hydraulics depends on a knowledge of the laws of gravitation. In it velocity and pressure are the two chief factors to be determined in every problem. All calculations showing the discharge of water under pressure are based on the head or depth of water above the outlet usually stated in feet. The universal standard of measurement is the pressure gauge showing the number of pounds pressure on each square inch.

A column of water 1 inch square and 2.31 feet high at  $60^{\circ}$  is equal to 1 pound, or will give a pressure equal to 1 pound. Hence :

$$\text{Pounds pressure} \times 2.31 = \text{head.}$$

$$\text{Depth of water} \div 2.31 = \text{pressure per square inch.}$$

$$\text{" " " " } \times .434 = \text{lbs. pressure.}$$

$$\text{Pounds pressure} \div .434 = \text{head or depth of water.}$$

Water under pressure is subject to the same laws as falling bodies. In a vacuum it will fall 16.1 feet in one second, and increases the velocity of its descent 32.2 feet each second while the descent continues, making the fall for 2 seconds equal to 64.4 feet, and so on. The velocity of a falling body per second is equal to  $\sqrt{2gh}$ , in which  $g$  equals force of gravity and  $h$  equals height, or  $8\sqrt{\text{height}}$ . Thus, in a cistern 25 feet deep, with a 1 inch hole in the bottom, the velocity of its efflux  $= 8\sqrt{25 \text{ feet}} = 40$  feet. This rule applies to all bodies falling freely in space when not impeded by resistance. Having found the velocity, the next step is to find the quantity discharged. This quantity discharged per minute is equal to the velocity in feet per second  $\times$  area of orifice in inches  $\times 12$  for inches and by 60 seconds in one minute  $=$  number of cubic inches discharged per minute, and this  $\div$  by 231, number of inches in a gallon,  $=$  gallons discharged per minute. Thus with the above cistern and outlet,  $8\sqrt{25} \times .7854 \times 12 \times 60 \div 231 = 98$  gallons per minute. This discharge is theoretical, in practice it varies with the form of the outlet. With the orifice in thin plate the discharge will equal from .6 to .7 of the theoretical quantity. A formula for quick and approximate calculation is  $\sqrt{\text{head}} \times \text{diameter of orifice} \times 19.5 =$  gallons discharged per minute; thus  $\sqrt{25} = 5 \times 1" \times 19.5 = 97\frac{1}{2}$  gallons. Formula for finding quantity of water delivered through pipes of any length, diameter and head :

$\sqrt{425 \times \text{diam. in inches} \times \text{pressure in lbs.} \div \text{length}} = \text{velocity.}$  Thus find water delivered per minute through 3,000 feet 3" pipe with a head of 6' :  $\sqrt{425 \times 3 \times 2.6 \text{ lbs.} \div 3000} = 1.05$  feet per second  $=$  velocity, and  $1.05 \times 7.07 \times 12 \times 60 \div 231 = 23.1$  gallons per minute  $=$  quantity discharged.

In all these calculations account must be taken of two kinds of loss : (1) Loss from velocity of entry occasioned by cross currents and shape of edge of orifice, and (2) loss by friction. This last is the principal cause of loss. The friction of water on smooth surfaces is about  $\frac{1}{2}$  pound per square foot when water is moving at the rate of 10 feet per second. If this velocity is increased or diminished, the friction increases or diminishes in proportion to the square of the velocity, thus—

$10^2 = 100 : 20^2 = 400 :: \frac{1}{2} : 2$  pounds. Again:

$10^2 = 100 : 5^2 = 25 :: \frac{1}{2} : \frac{1}{8}$  pounds. So that doubling the velocity increases the friction four fold, and when trebled it is increased 9 times.

Doubling the diameters of pipes increases their circumference or pipe surfaces in the same ratio ; but doubling their areas increases same four fold. Since pipes are to each other as the squares of their diameters, doubling the size of a pipe decreases frictional loss at same velocity  $\frac{1}{2}$  or the loss by friction is inversely as the size ; that in 2" is  $\frac{1}{2}$  that in 1", and in a 3" it is  $\frac{2}{3}$  that in a 2" pipe.

As an illustration: If pipe one inch in diameter be compared side by side with one two inches in diameter, the areas of their cross section being as one is to four, the velocity naturally is as four is to one in order to deliver any given quantity per hour through either of them. But the frictional resistance on either of their interior surfaces increases some what less than in the proportion of the square of velocities through them.

Taking, however, the velocity as above at 4 to 1, the frictional resistance per given surface becomes  $4^2$  to 1, or the frictional resistance per square foot is 16 times greater in the one-inch pipe than it is in the two-inch ; but there is but one-half the surface in the one-inch pipe that there is in the two-inch, so that we have  $16 \div 2 = 8$ . Or, while discharging a given quantity of water through a one-inch or a two-inch pipe, the frictional resistance is eight times greater in the smaller size than in the larger.

FRICTIONAL LOSS IN POUNDS PRESSURE IN  $2\frac{1}{2}$ " HOSE FOR EACH 100 FEET.

Gallons per minute.	Friction loss in rubber.	Loss in leather.
50	1.40	2.90
60	1.60	3.17
80	2.51	4.25
100	3.65	5.55
200	14.15	17.00
300	32.65	36.65
350	44.90	49.55

In the foregoing formulas, as well as in the case of friction in hose, it is assumed that all the conduits are on nearly straight lines. If the direction of flow is altered to any considerable extent by the interpolation of bends or elbows, the friction will be largely increased.

**Formulas for finding areas of pipes** required to deliver given quantities of water under given heads, in which A = area in square feet,  $a$  = area in square inches ; T = time in minutes,  $t$  = time in seconds : H = head in feet,  $h$  = head in inches.

1. When time is in seconds, head in inches and required area is in square inches—area of discharge pipe = number of gallons  $\div .0757 t \sqrt{h}$ .

2. When area is in square inches, time in seconds and the head in feet, the required area in square inches will be equal to gallons  $\div .26215 t \sqrt{H}$ .

3. When area is in square inches, time in minutes and head in inches, the required area in square inches will be equal to gallons  $\div 4.542 T \sqrt{h}$ .

4. When area is in square feet, time in seconds and head in inches, the required area in square feet will be equal to gallons  $\div 10.9 t \sqrt{h}$ .

5. When area is in square inches, time in minutes and head in feet, the required area in square inches will be equal to gallons  $\div 15.729 T \sqrt{H}$ .

6. When area is in square feet, time in seconds and head in feet, the required area in square feet will be equal to gallons  $\div 38.75 t \sqrt{H}$ .

7. When area is in square feet, time in minutes and head in inches, the required area in square feet will be equal to gallons  $\div 654 T \sqrt{h}$ .

8. When area is in square feet, the time in minutes and head in feet, the required area in square feet will be equal to gallons  $\div 22.65 T \sqrt{H}$ .

**PUMPS.**—The power to raise water depends on the height to be overcome, the quantity to be delivered and the friction in the pump and its connecting pipes, from which is deduced the formula—lbs. of water  $\times$  height in feet = number of foot pounds, and this divided by 33000 = horse-power necessary; to this must be added a liberal allowance for friction in the pipes and loss by condensation in the steam cylinders

When a vacuum is formed in a suction pipe, the pressure of the external air forces the water up the pipe, provided the lift is not too great. Theoretically water can be lifted by suction about 34 feet, but in practice not more than from 20 to 25 feet can be realized.

The nearer pumps are placed to the water the more easily can the water be raised.

Suction pipes should be air tight. They should have a capacity not less than half that of the pump cylinders, and when the lift is near its limit it should be even larger. By using large pipes friction is lessened, as is also the labor employed.

Air chambers contain large quantities of air which, being compressible, acts as a cushion and thus decreases the shocks which occur in suddenly stopping and starting a long water column, whether in the suction pipe or force main.

Water at high temperature, or volatile fluids, cannot be raised any considerable height by suction, because vapor forms, prevents the formation of a vacuum and resists the entrance of the water. When pumps are used for this purpose they must be placed very close to the fluid or be supplied from a head. Pumps and inspirators cannot force water heated to a temperature when steam forms in any quantity, and for this reason feed water is never injected into a boiler at over  $212^{\circ}$ , and generally at not over  $200^{\circ}$ .

Double-acting pumps keep up a steady stream and thus economize labor, as every stroke, up or down, is effective. In single-acting pumps every alternate stroke only avails.

*Submerged pumps* are placed entirely under water, which it forces. They are used when water is foul or gritty, as in cellars, sewers or tanneries.

*Hydraulic rams* are contrivances for raising small quantities of water to considerable heights by using the momentum of larger quantities flowing downwards. They differ from pumps in that they have no pistons, form no vacuum, and are always placed below the supply. The principle of their operation is: the inertia of the fluid in rapid motion suddenly stopped, as the jarring motion in pipes, and often called water-hammer.

It is estimated that, by conveying water to a ram through from 50 to 60 rods, that about  $\frac{1}{4}$  of the water can be discharged at an elevation five times the fall applied to the ram, or  $\frac{1}{14}$  of the water to 10 times the fall; thus: if ram have 5 feet fall,  $\frac{1}{4}$  of the water can be discharged 25 feet high, or  $\frac{1}{14}$ th at 50 feet, or with a fall of 10 feet  $\frac{1}{14}$ th can be raised 100 feet.

**Steam Pumps.**—The ordinary speed at which pumps should be run is not more than 100 feet piston travel per minute. The area of the steam piston  $\times$  the steam pressure = the total pressure exerted. The area of water piston  $\times$  pressure of water per square inch, is = the resistance. A liberal allowance must be made between the power and the resistance to move pistons at the required speed, for water friction and loss in steam cylinders.

To find horse-power necessary to elevate water to a given height. Formula: Total weight of water in pounds  $\times$  height in feet  $\div$  33,000 = horse-power required; to this liberal allowance as before stated must be made.

To find the diameter of a pump cylinder to move a given quantity of water per minute (100 feet of piston being the standard of speed), divide the number of gallons by 4, then extract the square root, and the product will be the diameter in inches of the pump cylinder.

To find quantity of water elevated in one minute running at 100 feet of piston speed per minute, square the diameter of the water cylinder in inches and multiply by 4. Example: Capacity of a 5-inch cylinder is desired. The square of the diameter (5 inches) is 25, which, multiplied by 4, gives 100, the number of gallons per minute (approximately).

**HORSE-POWER** is a term which has been adopted to express the work developed through a mechanical device by any of Nature's forces, and in the case of the steam engine is taken as the power necessary to raise 33,000 lbs. one foot high per minute; or, as it is commonly expressed, thirty-three thousand "foot-pounds."

It is divided into three classes, termed Nominal, Indicated and Actual.

Nominal horse-power has been used to express the capacity of an engine, the elements thereof being confined to the dimensions of the steam cylinders and a conventional pressure of steam and speed of engine.

Indicated, designates the full capacity in cylinder as developed in the operation, without deductions for friction.

Actual, is the power only as developed by its operation, involving elements of mean pressure, through the stroke applied to the piston, its velocity and a just deduction for friction. Its amount is usually arrived at by the application of a Dynamometer.

The actual horse-power added to the engine friction are equal to Indicated horse-power.

**BOILERS** should be simple in construction and of the best material. They should be capable of evaporating as much steam as may be required, whether for power or heating purposes.

They should have constant and thorough circulation throughout so as to maintain all parts at one temperature.

They should have large water and steam space to prevent foaming and sudden fluctuations in pressure or water level.

They should be readily accessible for cleaning and repairs.

*The furnace* is for the proper combustion of fuel, but the boiler proper is for the transfer of heat into useful effect by evaporating water into steam.

The efficiency of a boiler or its power is the volume or weight of steam that it will generate at its operating pressure in a unit of time, or per pound of fuel.

The most economical size of boiler is a medium one, and a departure therefrom in either direction is followed by a loss of effect. An unusually long or a very short boiler giving less duty for fuel used than a medium sized one properly proportioned to the work to be done.

The fire surface of boiler per horse power varies with its size, a small one not being so effective in proportion to the area as a large one, the loss by radiation being greater in proportion as the power is less.

The term horse-power as referring to boilers is very indefinite. It is preferable to estimate their capacity by the pounds of water evaporated per hour. Strictly speaking, there is no such thing as horse-power as applied to steam boilers, since it is only a measure applicable to dynamic effect. But as boilers are necessary to drive engines, the same term has been commonly applied to them.

Watt found in his time that the requirement for a horse-power in the best engine then in use was the evaporation of one cubic foot of water per hour in the boiler. Now it is estimated that good engines require water per hour per horse-power equal to the constant  $200 \div \sqrt{\text{pressure}}$ , and in the best engines the constant  $150 \div \sqrt{\text{pressure}}$ .

**Horse-Power of Boilers.**—The following proportions of heating and grate surfaces for each horse-power are generally accepted as approximately correct: In plain cylindrical boilers, 15 square feet of heating surface and 1 square foot of grate surface.

In flue boilers, 15 feet heating surface and  $\frac{3}{4}$ -foot of grate surface.

In tubular boilers, 15 to 16 square feet of heating surface and  $\frac{1}{2}$  square foot of grate surface.

A little more grate surface will probably give better results.

**COMBUSTION** consists in the combination of bodies with oxygen, the result being usually the development of heat and light. The combustibles used in the arts are principally composed of carbon and hydrogen. The carbon combining with oxygen derived from the air forms carbonic acid, and the hydrogen similarly combining forms water.

Carbonic acid is composed of one equivalent of carbon and two equivalents of oxygen, or by weight .2727 carbon, and .7273 oxygen.

Water is composed of one equivalent of oxygen and two equivalents of hydrogen, or by weight, .111 hydrogen and .889 oxygen.

TABLE OF THE CHEMICAL COMPOSITION OF COMBUSTIBLES.

Elements.	Coal.	Coke.	WOOD.			Oil of Tur- pentine.	Alcohol.	Bees- wax.
			Perfectly Dry.	Ordinary State.	Charcoal.			
Carbon.....	.812	.850	.510	.408	.930	.884	.5198	.816
Hydrogen .....	.048	....	.053	.042	....	.116	.1370	.139
Oxygen .....	.054	....	.417	.334	....	....	.3432	.045
Nitrogen and Sulphur..	.031	....	....	....	....	....	....	....
Water .....	....	....	....	.200	....	....	....	....
Ashes.....	.055	.150	.020	.016	.070	....	....	....
Total.....	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

TABLE OF THE CALORIFIC POWER OF COMBUSTIBLES.

	Units of Heat per lb.		Units of Heat per lb.
Hydrogen, burning to water.....	62535.	Wood, in ordinary state of dryness..	5040.
Carbon, burning to carbonic acid.....	12906.	Alcohol .....	12339.
Carbon, burning to carbonic oxide..	4453.	Oil of Turpentine.....	19505.
Wood, perfectly dried.....	6480.	Bees-wax .....	18900.

One pound of carbon combining with the necessary quantity of oxygen develops 12906 units of heat, and one pound of hydrogen similarly combining, yields 62535 units. The unit of heat is the amount necessary to heat one pound of water 1° Fahr.

When a combustible contains hydrogen and oxygen in the proportion required to form water, they combine during the process of combustion, but give out no useful heat. If hydrogen alone is present, it yields usefully the full amount of heat due to it. When oxygen is present, but in too small a proportion to combine with the whole of the hydrogen, there remains an excess of hydrogen which yields its due proportion of heat.

The heating power of a combustible is the maximum effect it is capable of producing; although when applied to practice there are sources of unavoidable loss which reduce its useful effect considerably.

The effect of water in a combustible with which it is more or less saturated is two-fold. 1st, the calorific power is reduced in the same proportion, and 2d, part of the heat in the residue is consumed uselessly in evaporating the water. Thus wood perfectly dried yields 6480 units, which, for wood in the ordinary state, containing 20% of water, is reduced to  $6480 \times 80 = 5184$  units, but the 20% water, say at 60°, will require for its evaporation  $(1178 - 62) \times .20 = 223$  units, so that its useful heat is reduced to  $5184 - 223 = 4961$  units.

The heating power of wood varies only with its state of dryness, that is to say, all the different kinds of wood in the same state of dryness, measured by weight, yield sensibly the same amount of heat.

When the chemical composition of a combustible is known, its calorific power is readily calculative; thus the average composition of coal is, carbon, .812; hydrogen, .048; oxygen, .054, and waste, .086; the hydrogen is reduced to .041 hydrogen in excess, the balance combining to form water. From this 1 lb. of coal will yield:

Carbon.....

Hydrogen in excess.....

$.812 \times 12906 = 10480$  heat units.

$.041 \times 62535 = 2564$  “ “

Again, wood properly dry contains .51 carbon, .053 hydrogen, and oxygen, .417. The hydrogen and oxygen being in proper proportions to form water, combine without yielding any useful heat, and so we have  $.51 \times 12906 = 6582$  units per lb. of dry wood.

**Air required to support combustion.**—A knowledge of the quantity of air necessary for different combustibles is important, in order to determine the sizes of flues, etc.

Carbonic acid is composed of .2727 carbon and .7273 oxygen, and atmospheric air is composed of .778 nitrogen, and .222 oxygen. A pound of carbon will require  $\frac{7.273}{2.727} = 2.67$  lbs. of oxygen, which is contained in  $\frac{2.67}{.222} = 12.03$  lbs. of air, and as a cubic foot of air at 62° Fahr. weighs .0761 lbs., this is equal to  $\frac{12.03}{.0761} = 158$  cubic feet of common air at ordinary temperature. This is the minimum amount necessary for the combustion of a pound of carbon.

Water being composed of .111 hydrogen and .889 oxygen, one pound of hydrogen requires  $\frac{8.89}{.111} = 8$  lbs. of oxygen, which is contained in  $\frac{8}{.222}$  or 36 lbs. of air, or  $\frac{36}{.0761} = 473$  cubic feet of common air at 62°, and this is the minimum amount of air necessary for the combustion of one pound of hydrogen.

From these elements we can calculate the quantity of air required for the combustion of any combustible whose composition is known. Thus, the average composition of coal is .812 carbon and .048 hydrogen, which last is, as before stated, reduced to .041 hydrogen in excess, and we shall require:  $(.812 \times 158) + (.041 \times 473) = 147.6$  cubic feet of air at 62° required for the combustion of 1 lb. of coal; but analyses of the air that has passed through the fires of well-arranged steam boilers show that the air retains 10 per cent. of oxygen unconsumed, so that we may admit of a practical rule that the quantity of air used should be double the minimum theoretical quantity.

In most cases the temperature of air in the chimneys of steam boilers is 550° Fahr., and has double the volume it has at 62°, and with the oxygen half consumed the air required in the chimney will be for the combustion of 1 lb. of carbon  $158 \times 2 \times 2 = 632$  cubic feet.

**STEAM ENGINE** is an instrument by means of which heat is converted into mechanical effect. Water in its state of steam is the medium through which this conversion is effected. An engine is operated by the expansive force of steam.

Experiments have demonstrated that not more than 13 per cent. of the heat generated is utilized even by the very best engines, while the great majority of them fall much below.

The horse power of an engine is equal to lifting 33,000 lbs. one foot per minute.

To find the horse power of an engine, multiply together the area of the piston in inches, the average steam pressure in pounds on the piston throughout the stroke, and the travel of the piston in feet, and divide by 33,000 for the required horse power. Thus, find the horse power of an engine with 40" cylinder, 10' stroke and 20 revolutions per minute,  $= 40 \times 40 = 1600 \times .7854 = 1256$  square inches area of piston  $\times$  say 30 lbs. average effective steam pressure  $\times$  400 feet travel  $= 15,072,000$  "foot-pounds"  $\div 33,000 = 457$  horse power. With this steam travels full stroke and exerts its greatest power. When steam is cut off, the average steam pressure must be taken.

The mechanical effect of steam in a cylinder is the product of the mean pressure in pounds and the distance through which it has passed in feet.

Back pressure is the force of uncondensed steam in a cylinder, due to friction in the exhaust pipe or valves, faulty setting of the latter, or in a condensing engine to a faulty vacuum. It is opposed to the course of the piston, and varies from 2 to 5 pounds per square inch.

# IMPORTANT PROPERTIES OF FAMILIAR SUBSTANCES.

	Specific Gravity Water, 1.	Specific Heat Water, 1.	Absorbing and radiat- ing power of bodies in units of heat per square root for dif- ference of 1°.	Conducting power in units of heat per square foot of surface with difference of 1°.	Weight in pounds.
<b>Metals from 32° to 212°.</b>					Per cubic inch.
Antimony.....	6.712	.0508	....	....	.2428
Bismuth.....	9.823	.0308	....	....	.3533
Brass.....	8.1	.0939	.049	....	.2930
Copper.....	8.788	.092	.0327	515.0	.3179
Iron, cast.....	7.5	.1298	.648	233.0	.2707
Iron, wrought.....	7.744	.1138	.566	233.0	.2801
Gold.....	19.258	.0324	....	....	.6965
Lead.....	11.352	.0314	.1329	113.0	.4106
Mercury at 32°.....	13.598	.0333	....	....	.4918
Nickel.....	8.800	.1086	....	....	.3183
Platinum.....	16.000	.0324	....	....	.5787
Silver.....	10.474	.056	.0265	....	.3788
Steel.....	7.834	.1165	....	....	.2916
Tin.....	7.291	.0562	.0439	....	.2637
Zinc.....	7.191	.0953	.049	225.0	.26
<b>Stones.</b>					Per cubic foot.
Chalk.....	2.784	.2149	.6786	....	174.0
Limestone.....	3.156	.2174	.735	...	197.0
Masonry.....	2.240	.2	.735	....	140.0
Marble, gray.....	2.686	.2694	.735	28.0	168.0
Marble, white.....	2.650	.2158	.735	22.4	165.0
<b>Woods.</b>					
Oak.....	.86	.57	.73	1.7	54.0
Pine, white.....	.55	.65	.73	.748	34.6
<b>Mineral Substances.</b>					
Charcoal, pine.....	.44	.2415	....	....	27.5
Coal, anthracite.....	1.43	.2411	....	....	89.7
Coke.....	1.00	.203	....	....	62.5
Glass, white.....	2.89	.1977	.5948	6.6	180.7
Sulphur.....	2.03	.2026	....	....	127.0
<b>Liquids.</b>					
Alcohol, mean.....	.9	.6588	....	....	57.5
Oil, petroleum.....	.80	.31	1.480	....	49.9
Steam at 212°.....	.0006	.847	....	....	.038
Turpentine.....	.87	.416	....	....	54.37
Water at 39.1°.....	1.000	1.000	1.0853	...	62.35
<b>Solid.</b>					
Ice at 32°.....	.922	.504	....	....	57.5
<b>Cases.</b>					
Air at 32°.....	.00122	.238	....	....	.0807
Oxygen.....	.00127	.2412	....	....	.0892
Hydrogen.....	.000089	3.2936	....	....	.00559
Carbonic acid.....	.00198	.2210	....	....	.1234



*The following tables are here given for convenient reference.*

## ELASTIC FORCE, TEMPERATURE AND VOLUME OF STEAM.

ELASTIC FORCE.		Temperature of Steam Corresponding to its Pressure.	Relative Volume. Bulk of Steam Compared to Bulk of Water.	Average Rise of Temperature for 1 lb. Pressure for each 10 lbs.
Apparent Pres- sure of Steam in lbs. per square inch	Absolute Pressure in inches of Mer- cury.			
0	30.0	212.0	1710.0	2.8
1	32.03	215.5	1612.0	
2	34.07	219.0	1523.0	
3	36.11	222.0	1442.0	
4	38.15	225.0	1372.0	
5	40.18	227.5	1312.0	
6	42.22	230.0	1248.0	
7	44.27	232.5	1194.0	
8	46.30	235.0	1168.0	
9	48.33	237.5	1103.0	
10	50.37	240.0	1061.0	1.75
11	.....	242.0	.....	
12	.....	244.0	.....	
13	.....	246.0	.....	
14	.....	248.0	.....	
15	60.56	250.0	895.0	
16	.....	252.0	.....	
17	.....	253.5	.....	
18	.....	254.5	.....	
19	.....	256.0	.....	
20	70.75	257.5	718.0	1.5
21	.....	259.0	.....	
22	.....	260.5	.....	
23	.....	262.0	.....	
24	.....	263.5	700.0	
25	80.91	265.0	684.0	
26	.....	266.5	.....	
27	.....	268.0	.....	
28	.....	269.5	.....	
29	.....	271.0	.....	
30	91.12	272.5	614.0	

A TABLE of the quantity of water which air is capable of absorbing to the point of maximum saturation, in grains per cubic foot for various temperatures.

Degrees Fahr.	Grains in a cubic foot.	Degrees Fahr.	Grains in a cubic foot.
10	1.1	85	12.43
15	1.31	90	14.38
20	1.56	95	16.60
25	1.85	100	19.12
30	2.19	105	22.0
32	2.35	110	25.5
35	2.59	115	30.0
40	3.06	130	42.5
45	3.61	141	58.0
50	4.24	157	85.0
55	4.97	170	112.5
60	5.82	179	138.0
65	6.81	188	166.0
70	7.94	195	194.0
75	9.24	212	265.0
80	10.73		

Units of heat required, per square foot per hour, of heating surface to heat 1 cubic foot of air at different temperatures.

External Temp.	Temperature of Air in Room.									
	40°	50°	60°	70°	80°	90°	100°	110°	120°	130°
	Units.	Units.	Units.	Units.	Units.	Units.	Units.	Units,	Units.	Units
0	0.822	1.028	1.234	1.439	1.645	1.851	2.056	2.262	2.467	2.673
10	0.604	0.805	1.007	1.208	1.409	1.611	1.812	2.013	2.215	2.416
20	0.393	0.590	0.787	0.984	1.181	1.378	1.575	1.771	1.968	2.165
30	0.192	0.385	0.578	0.770	0.963	1.155	1.345	1.540	1.733	1.925
40	0.000	0.188	0.376	0.564	0.752	0.940	1.128	1.316	1.504	1.692
50	0.000	0.000	0.184	0.367	0.551	0.735	0.918	1.102	1.286	1.470
60	0.000	0.000	0.000	0.197	0.359	0.538	0.718	0.897	1.077	1.256
70	0.000	0.000	0.000	0.000	0.175	0.350	0.525	0.700	0.875	1.049

STEAM PIPES

Heated body of cast iron,  $r=0.648$ , being the radiating and absorbing power of bodies, in units of heat per square foot, for a difference of 1° Fah.  
Units of heat,  $u$ , emitted or absorbed, per square foot per hour.

Mean temp. $t_1$ of heated body, pipe, etc.	Temp. $T$ or $t_1$ of air and walls.	UNITS OF HEAT PER SQUARE FOOT PER HOUR.				
		By Contact.		By Radiation.	By Radiation and Contact combined	
		Air Quiet.	Air Moving.		Air Quiet.	Air Moving.
210	70	130.49	217.48	139.96	270.49	357.48
220	70	142.20	237.00	155.27	297.47	392.27
230	70	153.95	256.58	169.56	323.51	426.14
240	70	165.90	279.83	184.58	350.48	464.41
250	70	178.00	296.66	200.18	378.18	496.84
260	70	189.90	316.50	214.36	404.26	530.86
270	70	202.70	337.83	233.42	436.12	571.25
280	70	215.30	258.85	251.21	466.51	610.06
290	70	228.55	380.91	267.73	496.28	648.64
300	70	240.85	401.41	279.12	519.97	680.53

HOT WATER PIPES.

Heated body of cast iron,  $r=0.648$ .  
Units of heat,  $u$ , emitted or absorbed, per square foot per hour.

Mean temp. $t_1$ of heated body, pipe, etc.	Temp. $T$ or $t_1$ of air and walls.	UNITS OF HEAT PER SQUARE FOOT PER HOUR.				
		By Contact.		By Radiation:	By Radiation and Contact combined	
		Air Quiet.	Air Moving.		Air Quiet.	Air Moving.
70	70	0	0	0	0	0
80	70	5.04	8.40	7.43	12.47	15.83
90	70	11.84	19.73	15.31	27.15	35.04
100	70	19.53	32.55	23.47	43.00	56.02
110	70	27.86	46.43	31.93	59.79	78.36
120	70	36.66	61.10	40.82	77.48	101.92
130	70	45.90	76.50	50.00	95.90	126.50
140	70	55.51	92.52	59.63	115.14	152.15
150	70	65.45	109.18	69.69	135.14	178.87
160	70	75.68	126.13	80.19	155.87	206.32
170	70	86.18	143.30	91.12	177.30	234.42
180	70	96.93	161.55	102.50	199.43	264.05
190	70	107.90	179.83	114.45	222.35	294.28
200	70	119.13	198.55	127.00	246.13	325.55
210	70	130.49	217.48	139.96	270.49	357.48

*Diameter of main and branch pipes* and square feet of coil surface they will supply, in a low pressure hot-water apparatus (212°) for direct or indirect radiation, when coils are at different altitudes for direct radiation or in the lower story for indirect radiation.

Diam. of Pipe, in inches.	Indirect Radiation	DIRECT RADIATION.										Area of Pipe in Square Inches.
		Height of Coil above bottom of Boiler, in feet.										
		0	10	20	30	40	50	60	70	80	90	
	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	
¾	49	50	52	53	55	57	59	61	63	65	68	0.4417
1	87	89	92	95	98	101	103	108	112	116	121	0.7854
1¼	136	140	144	149	153	158	161	169	175	182	189	1.227
1½	196	202	209	214	222	228	235	243	252	261	271	1.767
2	349	359	370	380	393	405	413	433	449	465	483	3.141
2½	546	561	577	595	613	633	643	678	701	727	755	4.908
3	785	807	835	856	888	912	941	974	1009	1046	1086	7.068
3½	1069	1099	1132	1166	1202	1241	1283	1327	1374	1425	1480	9.621
4	1395	1436	1478	1520	1571	1621	1654	1733	1795	1861	1933	12.56
4½	1767	1817	1871	1927	1988	2052	2120	2193	2272	2356	2445	15.90
5	2185	2244	2309	2376	2454	2531	2574	2713	2805	2907	3019	19.63
6	3140	3228	3341	3424	3552	3648	3763	3897	4036	4184	4344	28.27
7	4276	4396	4528	4664	4808	4964	5132	5308	5496	5700	5920	38.48
8	5580	5744	5912	6080	6284	6484	6616	6932	7180	7444	7735	50.26
9	7068	7268	7484	7708	7952	8208	8482	8774	9088	9424	9780	63.62
10	8740	8976	9236	9516	9816	10124	10296	10852	11220	11628	12076	97.54
11	10559	10860	11180	11519	11879	12262	12666	13108	13576	14078	14620	95.03
12	12560	12912	13364	13696	14208	14592	15052	15588	16144	16736	17376	113.09
13	14748	15169	15615	16090	16591	17126	17697	18307	18961	19633	20420	132.73
14	17104	17584	18109	18656	19232	19856	20528	21232	21984	22800	23680	153.93
15	19634	20195	20789	21419	22089	22801	23561	24373	25244	26179	27168	176.71
16	22320	22978	23643	24320	25136	25936	26464	27728	28720	29776	30928	201.06

*Diameter of steam supply pipes* and square feet of radiating surface they will furnish with steam from 9 to 625 feet from the boiler.

STEAM PRESSURE 1 LB. PER SQUARE INCH—215.5°.

Diam- eter of Pipe in inches.	Distance of Radiator from Boiler, in feet.							
	9	64	100	225	324	400	484	625
	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.
3/4	146	55	44	29	24	22	20	17
1	301	113	90	60	50	41	41	36
1 1/4	529	198	158	106	88	79	72	63
1 1/2	832	312	249	166	139	124	113	99
2	1707	640	512	341	284	256	233	205
2 1/2	2982	1118	894	596	497	447	406	357
3	4708	1765	1412	941	784	706	642	565
3 1/2	6919	2595	2075	1384	1153	1037	942	828
4	9146	3429	2743	1889	1524	1371	1247	1097
4 1/2	12966	4862	3889	2593	2161	1944	1768	1555
5	17005	6377	5101	3401	2834	2550	2319	2040
6	26628	9985	7988	5325	4438	3994	3631	3195
7	39150	14684	11747	7831	6526	5873	5340	4698
8	54679	20504	16404	10936	9113	8202	7456	6560
9	73659	27622	22098	14731	12276	11049	10044	8836
10	95496	35811	28648	19099	15916	14324	13022	11459

Diameter of steam supply pipes and square feet of radiating surface they will furnish with steam from 9 to 625 feet from the boiler.

STEAM PRESSURE 3 LBS. PER SQUARE INCH, 222°.

Diam- eter of Pipe in inches.	Distance of Radiator from Boiler, in feet.							
	9	64	100	225	324	400	484	625
	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.
3/4	240	90	72	48	40	36	32	29
1	494	185	148	98	82	74	68	59
1 1/4	863	324	259	172	144	129	118	103
1 1/2	1361	510	408	272	226	204	185	163
2	2796	1049	839	559	466	419	381	335
2 1/2	4884	1831	1465	977	814	732	666	585
3	7700	2887	2310	1540	1283	1155	1050	924
3 1/2	11323	4246	3797	2264	1887	1698	1544	1358
4	15819	5932	4745	3164	2636	2372	2157	1898
4 1/2	21226	7959	6368	4245	3537	3184	2894	2547
5	27997	10361	8289	5599	4666	4144	3768	3315
6	44230	16586	13269	8846	7372	6634	6031	5307
7	64013	24005	19204	12802	10668	9602	8729	7681
8	89615	33605	26884	17923	14936	13442	12220	10754
9	120275	45103	36082	24055	20046	18041	16401	14433
10	156277	58604	46883	31255	26046	23441	21310	18753

Diameter of steam supply pipes and square feet of radiating surface they will furnish with steam from 9 to 625 feet from the boiler.

STEAM PRESSURE 5 LBS. PER SQUARE INCH, 227.5°

Diam- eter of Pipe in inches.	Distance of Radiator from Boiler, in feet.							
	9	64	100	225	324	400	484	625
	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.
3/4	288	110	88	59	48	44	40	35
1	604	224	181	121	100	90	82	72
1 1/4	1058	397	317	211	176	158	135	127
1 1/2	1669	626	500	334	278	250	227	200
2	3434	1288	1030	686	572	515	468	412
2 1/2	5980	2242	1794	1196	996	897	815	717
3	9436	3539	2831	1887	1572	1415	1290	1132
3 1/2	13899	5212	4170	2779	2316	2085	1895	1667
4	19430	7286	5829	3886	3271	2914	2649	2331
4 1/2	25958	9734	7787	5191	4326	3893	3540	3114
5	35133	13175	10540	7026	5855	5270	4791	4216
6	53433	20037	16030	10686	8905	8015	7286	6412
7	78439	29414	25531	15687	13076	12765	10651	11412
8	109517	41068	32855	21903	18253	16427	14934	13142
9	137053	55144	44116	27410	25042	22058	20052	17646
10	191360	71760	57408	38272	31893	28704	26094	22963

Diameter of steam supply pipes and square feet of radiating surface they will furnish with steam from 9 to 625 feet from the boiler.

STEAM PRESSURE 10 LBS. PER SQUARE INCH, 240°.

Diameter of pipe in inches.	DISTANCE OF RADIATOR FROM BOILER, IN FEET.							
	9	64	100	225	324	400	484	625
	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.
3/4	366	137	109	73	61	55	50	44
1	752	282	225	150	125	112	102	90
1 1/4	1312	492	393	262	218	196	179	157
1 1/2	2074	777	622	415	345	311	281	249
2	4244	1591	1273	848	707	636	578	509
2 1/2	7436	2788	2231	1487	1239	1115	1014	892
3	11702	4388	3510	2340	1950	1755	1595	1404
3 1/2	17205	6452	5161	3441	2884	2580	2346	2064
4	24042	9016	7212	4808	4007	3606	3278	2884
4 1/2	32292	12109	9687	6458	5382	4843	4403	3873
5	42013	17505	12604	8402	7002	6302	5729	5040
6	67564	25337	20269	13513	11260	10134	9213	8107
7	97372	36514	29211	19474	16228	14605	13278	11684
8	136209	51078	40862	27242	22701	20431	18574	16344
9	182955	68608	54886	35591	30492	27443	24948	21954
10	237973	89240	71392	47594	39662	35696	32451	28556

A SIMPLE METHOD OF CALCULATING INTEREST.

If at 6 per cent., multiply the dollars by the number of days, and divide by 6, and cut off one figure on the right, thus:

EXAMPLE: What is the interest on \$46.25 from April 12 to July 15, which is 94 days?

94

46

564

376

6)4324

.72

Ans. .72 cents.

If at 7 per cent., after following above rule, add  $\frac{1}{8}$ , thus :

72

1/8 = 12

.84

Ans. 84 cents.

If at 5 per cent., deduct  $\frac{1}{8}$ , thus:

72

1/8 = 12

.60

Ans. 60 cents.

## DISCOUNT TABLE.

As many of the goods embraced in this book are sold by discounts, or a series of discounts from their list of prices, it will be found convenient to refer to a table and ascertain at once the equivalent and net remainder.

For instance, a discount of 50, 10 and 5% (erroneously supposed by many to equal 65%) is equivalent to 57 $\frac{1}{4}$ %, and the net remainder, 42 $\frac{3}{4}$ %, is the multiplier with which to ascertain the NET price.

Discount. Per Cent.	Equiv- alent.	Net.	Discount. Per Cent.	Equiv- alent.	Net.	Discount. Per Cent.	Equiv- alent.	Net.
25	.25	.75	30 & 5 & 2 $\frac{1}{2}$	.3516	.6484	35 & 7 $\frac{1}{2}$ & 7 $\frac{1}{2}$	.4438	.5562
" & 2 $\frac{1}{2}$	.26875	.73125	" 5 5	.36825	.63175	" 7 $\frac{1}{2}$ 10	.4589	.5411
" 2 $\frac{1}{2}$ & 2 $\frac{1}{2}$	.2870	.7130	" 5 7 $\frac{1}{2}$	.3849	.6151	" 10	.415	.585
" 2 $\frac{1}{2}$ 5	.3053	.6947	" 5 10	.4015	.5985	" 10 2 $\frac{1}{2}$	.4296	.5704
" 2 $\frac{1}{2}$ 7 $\frac{1}{2}$	.3236	.6764	" 7 $\frac{1}{2}$	.3525	.6475	" 10 5	.44425	.55575
" 2 $\frac{1}{2}$ 10	.3419	.6581	" 7 $\frac{1}{2}$ 2 $\frac{1}{2}$	.3687	.6313	" 10 7 $\frac{1}{2}$	.4589	.5411
" 5	.2875	.7125	" 7 $\frac{1}{2}$ 5	.3849	.6151	" 10 10	.4735	.5265
" 5 2 $\frac{1}{2}$	.3053	.6947	" 7 $\frac{1}{2}$ 7 $\frac{1}{2}$	.4009	.5991			
" 5 5	.3231	.6769	" 7 $\frac{1}{2}$ 10	.41725	.58275	37 $\frac{1}{2}$	.375	.625
" 5 7 $\frac{1}{2}$	.3409	.6591	" 10	.37	.63	" 2 $\frac{1}{2}$	.3906	.6094
" 5 10	.35875	.64125	" 10 2 $\frac{1}{2}$	.38575	.61425	" 2 $\frac{1}{2}$ 2 $\frac{1}{2}$	.4059	.5941
" 7 $\frac{1}{2}$	.30625	.69375	" 10 5	.4016	.5985	" 2 $\frac{1}{2}$ 5	.4211	.5789
" 7 $\frac{1}{2}$ 2 $\frac{1}{2}$	.3236	.6764	" 10 7 $\frac{1}{2}$	.41725	.58274	" 2 $\frac{1}{2}$ 7 $\frac{1}{2}$	.4363	.5637
" 7 $\frac{1}{2}$ 5	.3409	.6591	" 10 10	.433	.567	" 2 $\frac{1}{2}$ 10	.4516	.5484
" 7 $\frac{1}{2}$ 7 $\frac{1}{2}$	.3583	.6417				" 5	.40625	.59375
" 7 $\frac{1}{2}$ 10	.3756	.6244	32 $\frac{1}{2}$	.325	.675	" 5 2 $\frac{1}{2}$	.4211	.5789
" 10	.3250	.6750	" 2 $\frac{1}{2}$	.3419	.6581	" 5 5	.4359	.5641
" 10 2 $\frac{1}{2}$	.3419	.6581	" 2 $\frac{1}{2}$ 2 $\frac{1}{2}$	.3583	.6417	" 5 7 $\frac{1}{2}$	.4508	.5492
" 10 5	.35875	.64125	" 2 $\frac{1}{2}$ 5	.3748	.6252	" 5 10	.4656	.5344
" 10 7 $\frac{1}{2}$	.3756	.6244	" 2 $\frac{1}{2}$ 7 $\frac{1}{2}$	.3912	.6088	" 7 $\frac{1}{2}$	.4219	.5781
" 10 10	.3925	.6075	" 2 $\frac{1}{2}$ 10	.4077	.5923	" 7 $\frac{1}{2}$ 2 $\frac{1}{2}$	.4363	.5637
			" 5	.35875	.64125	" 7 $\frac{1}{2}$ 5	.4508	.5492
27 $\frac{1}{2}$	.275	.725	" 5 2 $\frac{1}{2}$	.3748	.6252	" 7 $\frac{1}{2}$ 7 $\frac{1}{2}$	.4652	.5348
" 2 $\frac{1}{2}$	.2931	.7069	" 5 5	.3908	.6092	" 7 $\frac{1}{2}$ 10	.4797	.5203
" 2 $\frac{1}{2}$ 2 $\frac{1}{2}$	.3108	.6892	" 5 7 $\frac{1}{2}$	.4068	.5932	" 10	.4375	.5625
" 2 $\frac{1}{2}$ 5	.3285	.6715	" 5 10	.4229	.5771	" 10 2 $\frac{1}{2}$	.4516	.5484
" 2 $\frac{1}{2}$ 7 $\frac{1}{2}$	.3461	.6539	" 7 $\frac{1}{2}$	.3756	.6244	" 10 5	.4656	.5344
" 2 $\frac{1}{2}$ 10	.3638	.6362	" 7 $\frac{1}{2}$ 2 $\frac{1}{2}$	.3912	.6088	" 10 7 $\frac{1}{2}$	.4797	.5203
" 5	.31125	.68875	" 7 $\frac{1}{2}$ 5	.4068	.5932	" 10 10	.49375	.50625
" 5 2 $\frac{1}{2}$	.3285	.6715	" 7 $\frac{1}{2}$ 7 $\frac{1}{2}$	.4226	.5775			
" 5 5	.3457	.6543	" 7 $\frac{1}{2}$ 10	.4381	.5619	40	.40	.60
" 5 7 $\frac{1}{2}$	.3629	.6371	" 10	.3925	.6075	" 2 $\frac{1}{2}$	.415	.585
" 5 10	.3801	.6199	" 10 2 $\frac{1}{2}$	.4077	.5923	" 2 $\frac{1}{2}$ 2 $\frac{1}{2}$	.4296	.5704
" 7 $\frac{1}{2}$	.3294	.6706	" 10 5	.4229	.5771	" 2 $\frac{1}{2}$ 5	.44425	.55575
" 7 $\frac{1}{2}$ 2 $\frac{1}{2}$	.3461	.6539	" 10 7 $\frac{1}{2}$	.4381	.5619	" 2 $\frac{1}{2}$ 7 $\frac{1}{2}$	.4589	.5411
" 7 $\frac{1}{2}$ 5	.3629	.6371	" 10 10	.45325	.54675	" 2 $\frac{1}{2}$ 10	.4735	.5265
" 7 $\frac{1}{2}$ 7 $\frac{1}{2}$	.3797	.6203				" 5	.43	.57
" 7 $\frac{1}{2}$ 10	.3964	.6036	35	.35	.65	" 5 2 $\frac{1}{2}$	.44425	.55575
" 10	.3475	.6525	" 2 $\frac{1}{2}$	.36625	.63375	" 5 5	.4585	.5415
" 10 2 $\frac{1}{2}$	.3638	.6362	" 2 $\frac{1}{2}$ 2 $\frac{1}{2}$	.3821	.6179	" 5 7 $\frac{1}{2}$	.47275	.52725
" 10 5	.3801	.6199	" 2 $\frac{1}{2}$ 5	.3979	.6021	" 5 10	.487	.513
" 10 7 $\frac{1}{2}$	.3965	.6035	" 2 $\frac{1}{2}$ 7 $\frac{1}{2}$	.4138	.5862	" 7 $\frac{1}{2}$	.445	.555
" 10 10	.41275	.58725	" 2 $\frac{1}{2}$ 10	.4296	.5704	" 7 $\frac{1}{2}$ 2 $\frac{1}{2}$	.4589	.5411
			" 5	.3825	.6175	" 7 $\frac{1}{2}$ 5	.47275	.52725
30	.30	.70	" 5 2 $\frac{1}{2}$	.3979	.6021	" 7 $\frac{1}{2}$ 7 $\frac{1}{2}$	.4866	.5134
" 2 $\frac{1}{2}$	.3175	.6825	" 5 5	.4134	.5866	" 7 $\frac{1}{2}$ 10	.5005	.4995
" 2 $\frac{1}{2}$ 2 $\frac{1}{2}$	.3346	.6654	" 5 7 $\frac{1}{2}$	.4288	.5712	" 10	.46	.54
" 2 $\frac{1}{2}$ 5	.3516	.6484	" 5 10	.44425	.55575	" 10 2 $\frac{1}{2}$	.4735	.5265
" 2 $\frac{1}{2}$ 7 $\frac{1}{2}$	.3687	.6313	" 7 $\frac{1}{2}$	.39875	.60125	" 10 5	.487	.513
" 2 $\frac{1}{2}$ 10	.38575	.61425	" 7 $\frac{1}{2}$ 2 $\frac{1}{2}$	.4138	.5862	" 10 7 $\frac{1}{2}$	.5005	.4995
" 5	.335	.665	" 7 $\frac{1}{2}$ 5	.4288	.5712	" 10 10	.524	.486

DISCOUNT TABLE.—CONTINUED.

Discount. Per Cent.	Equiv- alent.	Net.	Discount. Per Cent.	Equiv- alent.	Net.	Discount. Per Cent.	Equiv- alent.	Net.
42½	.425	.575	47½ & 10	.5275	.4725	55 & 5 & 10	.61525	.38475
" & 2½	.4394	.5606	" 10 & 2½	.5393	.4607	" 7½	.58375	.41625
" 2½ & 2½	.4534	.5466	" 10 5	.5511	.4489	" 7½ 2½	.5942	.4058
" 2½ 5	.4674	.5326	" 10 7½	.5629	.4371	" 7½ 5	.6046	.3954
" 2½ 7½	.4814	.5186	" 10 10	.57475	.42525	" 7½ 7½	.615	.385
" 2½ 10	.4954	.5046				" 7½ 10	.6254	.3746
" 5	.45375	.54625	50	.50	.50	" 10	.595	.405
" 5 2½	.4674	.5326	" 2½	.5125	.4875	" 10 2½	.6051	.3949
" 5 5	.4811	.5189	" 2½ 2½	.5247	.4753	" 10 5	.61525	.38475
" 5 7½	.4947	.5053	" 2½ 5	.5369	.4631	" 10 7½	.6254	.3746
" 5 10	.5084	.4916	" 2½ 7½	.5491	.4509	" 10 10	.6355	.3645
" 7½	.4681	.5319	" 2½ 10	.56125	.43875			
" 7½ 2½	.4814	.5186	" 5	.525	.475	57½	.575	.425
" 7½ 5	.4947	.5053	" 5 2½	.5369	.4631	" 2½	.5856	.4144
" 7½ 7½	.508	.492	" 5 5	.54875	.45125	" 2½ 2½	.596	.404
" 7½ 10	.5213	.4787	" 5 7½	.5606	.4394	" 2½ 5	.6063	.3937
" 10	.4825	.5175	" 5 10	.5725	.4275	" 2½ 7½	.6167	.3833
" 10 2½	.4954	.5046	" 7½	.5375	.4625	" 2½ 10	.6271	.3729
" 10 5	.5084	.4916	" 7½ 2½	.5491	.4509	" 5	.59625	.40375
" 10 7½	.5213	.4787	" 7½ 5	.5606	.4394	" 5 2½	.6063	.3937
" 10 10	.53425	.46575	" 7½ 7½	.5722	.4278	" 5 5	.6164	.3836
			" 7½ 10	.58375	.41625	" 5 7½	.6265	.3735
			" 10	.55	.45	" 5 10	.6366	.3634
45	.45	.55	" 10 2½	.56125	.43875	" 7½	.6069	.3931
" 2½	.46375	.53625	" 10 5	.5725	.4275	" 7½ 2½	.6167	.3833
" 2½ 2½	.4772	.5228	" 10 7½	.58375	.41625	" 7½ 5	.6265	.3735
" 2½ 5	.4906	.5094	" 10 10	.595	.405	" 7½ 7½	.6364	.3636
" 2½ 7½	.504	.496				" 7½ 10	.6462	.3538
" 2½ 10	.5174	.4826	52½	.525	.475	" 10	.6175	.3825
" 5	.4775	.5225	" 2½	.5369	.4631	" 10 2½	.6271	.3729
" 5 2½	.4906	.5094	" 2½ 2½	.5485	.4515	" 10 5	.6366	.3634
" 5 5	.5036	.4964	" 2½ 5	.56	.44	" 10 7½	.6462	.3538
" 5 7½	.5167	.4833	" 2½ 7½	.5716	.4284	" 10 10	.65575	.34425
" 5 10	.52975	.47025	" 2½ 10	.5832	.4168			
" 7½	.49125	.50875	" 5	.54875	.45125	60	.60	.40
" 7½ 2½	.504	.496	" 5 2½	.56	.44	" 2½	.61	.39
" 7½ 5	.5167	.4833	" 5 5	.5713	.4287	" 2½ 2½	.61975	.38025
" 7½ 7½	.5294	.4706	" 5 7½	.5826	.4174	" 2½ 5	.6295	.3705
" 7½ 10	.5421	.4579	" 5 10	.5939	.4061	" 2½ 7½	.63925	.36075
" 10	.505	.495	" 7½	.5606	.4394	" 2½ 10	.649	.351
" 10 2½	.5174	.4826	" 7½ 2½	.5716	.4284	" 5	.62	.38
" 10 5	.52975	.47025	" 7½ 5	.5826	.4174	" 5 2½	.6295	.3705
" 10 7½	.5421	.4579	" 7½ 7½	.5936	.4064	" 5 5	.639	.361
" 10 10	.5545	.4455	" 7½ 10	.6046	.3954	" 5 7½	.6485	.3515
			" 10	.5725	.4275	" 5 10	.658	.342
47½	.475	.525	" 10 2½	.5832	.4168	" 7½	.63	.37
" 2½	.4881	.5119	" 10 5	.5939	.4061	" 7½ 2½	.63925	.36075
" 2½ 2½	.5009	.4991	" 10 7½	.6046	.3954	" 7½ 5	.6485	.3515
" 2½ 5	.5137	.4863	" 10 10	.61525	.38475	" 7½ 7½	.65775	.34225
" 2½ 7½	.5265	.4735				" 7½ 10	.667	.333
" 2½ 10	.5393	.4607	55	.55	.45	" 10	.64	.36
" 5	.50125	.49875	" 2½	.56125	.43875	" 10 2½	.649	.351
" 5 2½	.5137	.4863	" 2½ 2½	.5722	.4278	" 10 5	.658	.342
" 5 5	.5262	.4738	" 2½ 5	.5832	.4168	" 10 7½	.667	.333
" 5 7½	.5386	.4614	" 2½ 7½	.5942	.4058	" 10 10	.676	.324
" 5 10	.5511	.4489	" 2½ 10	.6051	.3949			
" 7½	.5144	.4856	" 5	.5725	.4275	62½	.625	.375
" 7½ 2½	.5265	.4735	" 5 2½	.5832	.4168	" 2½	.6344	.3656
" 7½ 5	.5387	.4613	" 5 5	.5939	.4061	" 2½ 2½	.6435	.3565
" 7½ 7½	.5508	.4492	" 5 7½	.6046	.3954	" 2½ 5	.6527	.3473
" 7½ 10	.5629	.4371						



## DISCOUNT TABLE.—CONTINUED.

Discount. Per Cent.	Equiv- alent.	Net.	Discount. Per Cent.	Equiv- alent.	Net.	Discount. Per Cent.	Equiv- alent.	Net.
62½ & 2½ & 7½	.6618	.3382	67½ & 5 & 10	.7221	.2779	72½ & 10		.7525 .2475
" 2½ 10	.6709	.3291	" 7½	.6994	.3006	" 10 & 2½		.7587 .2413
" 5	.64375	.35625	" 7½ 2½	.7069	.2931	" 10 5		.7649 .2351
" 5 2½	.6527	.3473	" 7½ 5	.7144	.2856	" 10 7½		.7711 .2289
" 5 5	.6616	.3384	" 7½ 7½	.7219	.2781	" 10 10		.77725 .22275
" 5 7½	.6705	.3295	" 7½ 10	.7294	.2706			
" 5 10	.6794	.3206	" 10	.7075	.2925	75		.75 .25
" 7½	.6531	.3469	" 10 2½	.7148	.2852	" 2½		.75625 .24375
" 7½ 2½	.6618	.3382	" 10 5	.7221	.2779	" 2½ 2½		.76234 .23766
" 7½ 5	.6705	.3295	" 10 7½	.7294	.2706	" 2½ 5		.7684 .2316
" 7½ 7½	.6791	.3209	" 10 10	.73675	.26325	" 2½ 7½		.7745 .2255
" 7½ 10	.6878	.3122				" 2½ 10		.7806 .2194
" 10	.6625	.3375	70	.70	.30	" 5		.7625 .2375
" 10 2½	.6709	.3291	" 2½	.7075	.2925	" 5 2½		.7684 .2316
" 10 5	.6794	.3206	" 2½ 2½	.7148	.2852	" 5 5		.7744 .2256
" 10 7½	.6878	.3122	" 2½ 5	.7221	.2779	" 5 7½		.7803 .2197
" 10 10	.69625	.30375	" 2½ 7½	.7294	.2706	" 5 10		.78625 .21325
			" 2½ 10	.73675	.26325	" 7½		.76875 .23125
65	.65	.35	" 5	.715	.285	" 7½ 2½		.7745 .2255
" 2½	.65875	.34125	" 5 2½	.7221	.2779	" 7½ 5		.7803 .2197
" 2½ 2½	.6673	.3327	" 5 5	.72925	.27075	" 7½ 7½		.7861 .2139
" 2½ 5	.6758	.3242	" 5 7½	.7364	.2636	" 7½ 10		.7919 .2081
" 2½ 7½	.6843	.3157	" 5 10	.7435	.2565	" 10		.775 .225
" 2½ 10	.6929	.3071	" 7½	.7225	.2775	" 10 2½		.7806 .2194
" 5	.6675	.3325	" 7½ 2½	.7294	.2706	" 10 5		.78625 .21375
" 5 2½	.6758	.3242	" 7½ 5	.7364	.2636	" 10 7½		.7919 .2081
" 5 5	.6841	.3159	" 7½ 7½	.7433	.2567	" 10 10		.7975 .2025
" 5 7½	.6924	.3076	" 7½ 10	.75025	.24975			
" 5 10	.70075	.29925	" 10	.73	.27	77½		.775 .225
" 7½	.67625	.32375	" 10 2½	.73675	.26325	" 2½		.7806 .2194
" 7½ 2½	.6843	.3157	" 10 5	.7435	.2565	" 2½ 2½		.7861 .2139
" 7½ 5	.6924	.3076	" 10 7½	.75025	.24975	" 2½ 5		.7916 .2084
" 7½ 7½	.7005	.2995	" 10 10	.757	.243	" 2½ 7½		.7971 .2029
" 7½ 10	.7086	.2914				" 2½ 10		.8026 .1974
" 10	.685	.315	72½	.725	.275	" 5		.78625 .21375
" 10 2½	.6929	.3071	" 2½	.7319	.2681	" 5 2½		.7916 .2084
" 10 5	.70075	.29925	" 2½ 2½	.7386	.2614	" 5 5		.7969 .2031
" 10 7½	.7086	.2914	" 2½ 5	.7452	.2548	" 5 7½		.8023 .1977
" 10 10	.7165	.2835	" 2½ 7½	.752	.248	" 5 10		.8076 .1924
			" 2½ 10	.7587	.2413	" 7½		.7919 .2081
67½	.675	.325	" 5	.73875	.26125	" 7½ 2½		.7971 .2029
" 2½	.6831	.3169	" 5 2½	.7453	.2547	" 7½ 5		.8023 .1977
" 2½ 2½	.691	.309	" 5 5	.7518	.2482	" 7½ 7½		.8075 .1925
" 2½ 5	.699	.301	" 5 7½	.7583	.2417	" 7½ 10		.8127 .1873
" 2½ 7½	.7069	.2931	" 5 10	.7649	.2351	" 10		.7975 .2025
" 2½ 10	.7148	.2852	" 7½	.7456	.2544	" 10 2½		.8026 .1974
" 5	.69125	.30875	" 7½ 2½	.752	.248	" 10 5		.8076 .1924
" 5 2½	.699	.301	" 7½ 5	.7583	.2417	" 10 7½		.8127 .1873
" 5 5	.7067	.2933	" 7½ 7½	.7647	.2353	" 10 10		.81775 .18225
" 5 7½	.7144	.2856	" 7½ 10	.7711	.2289			

TABLE SHOWING THE NUMBER OF DAYS FROM ANY DATE IN ONE MONTH  
TO THE SAME DATE IN ANY OTHER MONTH:

FROM	JAN.	FEB.	MAR.	APRIL.	MAY.	JUNE	JULY.	AUG.	SEPT.	OCT.	NOV.	DEC.
January .....	365	31	59	90	120	151	181	212	243	273	304	334
February .....	334	365	28	59	89	120	150	181	212	242	273	303
March .....	306	337	365	31	61	92	122	153	184	214	245	275
April .....	275	306	334	365	30	61	91	122	153	183	214	244
May .....	245	276	304	335	365	31	61	92	123	153	184	214
June .....	214	245	273	304	334	365	30	61	92	122	153	183
July .....	184	215	243	274	304	335	365	31	62	92	123	153
August .....	153	184	212	243	273	304	334	365	31	61	92	122
September .....	122	153	181	212	242	273	303	334	365	30	61	91
October .....	92	123	151	182	212	243	273	304	335	365	31	61
November .....	61	92	120	151	181	212	242	273	304	334	365	30
December .....	31	62	90	121	151	182	212	243	274	304	335	365

NOTE.—If Leap-year, add one day if February be included.

EXAMPLE: How many days from February 12 to August 12? Look for February at left-hand, and August at the top. The angle and answer is 181 days.

If different dates of different months are required, add the odd number of days to the even days, thus: Time, from April 12 to July 15.  
EXAMPLE: From April 12 to July 12 is 91 days, and from the 12th to the 15th of July it is 3 days, which, added to the 91 days gives the time from April 12 to July 15, or answer, 94 days.

FOR CALCULATING WAGES FROM ONE HOUR TO SIX DAYS, AT FROM  
\$1.00 TO \$20.00 PER WEEK.

FOR 6 DAYS.	1 DAY.	2 DAYS.	3 DAYS.	4 DAYS.	5 DAYS.	1 HOUR.	2 HOURS.	3 HOURS.	4 HOURS.	5 HOURS.	6 HOURS.	7 HOURS.	8 HOURS.	9 HOURS.
\$1.00	.16 <sup>2</sup> <sub>3</sub>	.33 <sup>1</sup> <sub>3</sub>	.50	.66 <sup>2</sup> <sub>3</sub>	.83 <sup>1</sup> <sub>3</sub>	.01 <sup>2</sup> <sub>3</sub>	.03 <sup>1</sup> <sub>3</sub>	.05	.06 <sup>2</sup> <sub>3</sub>	.08 <sup>1</sup> <sub>3</sub>	.10	.11 <sup>2</sup> <sub>3</sub>	.13 <sup>1</sup> <sub>3</sub>	.15
1.50	.25	.50	.75	1.00	1.25	.02 <sup>1</sup> <sub>3</sub>	.05	.07 <sup>1</sup> <sub>3</sub>	.10	.12 <sup>1</sup> <sub>3</sub>	.15	.17 <sup>1</sup> <sub>3</sub>	.20	.22 <sup>1</sup> <sub>3</sub>
2.00	.33 <sup>1</sup> <sub>3</sub>	.66 <sup>2</sup> <sub>3</sub>	1.00	1.33 <sup>1</sup> <sub>3</sub>	1.66 <sup>2</sup> <sub>3</sub>	.03 <sup>1</sup> <sub>3</sub>	.06 <sup>2</sup> <sub>3</sub>	.10	.13 <sup>1</sup> <sub>3</sub>	.16 <sup>2</sup> <sub>3</sub>	.20	.23 <sup>1</sup> <sub>3</sub>	.26 <sup>2</sup> <sub>3</sub>	.30
2.50	.41 <sup>2</sup> <sub>3</sub>	.83 <sup>1</sup> <sub>3</sub>	1.25	1.66 <sup>2</sup> <sub>3</sub>	2.08 <sup>1</sup> <sub>3</sub>	.04 <sup>1</sup> <sub>3</sub>	.08 <sup>1</sup> <sub>3</sub>	.12 <sup>1</sup> <sub>3</sub>	.16 <sup>2</sup> <sub>3</sub>	.20 <sup>6</sup> <sub>3</sub>	.25	.29 <sup>1</sup> <sub>3</sub>	.33 <sup>1</sup> <sub>3</sub>	.37 <sup>1</sup> <sub>3</sub>
3.00	.50	1.00	1.50	2.00	2.50	.05	.10	.15	.20	.25	.30	.35	.40	.45
3.50	.58 <sup>1</sup> <sub>3</sub>	1.16 <sup>2</sup> <sub>3</sub>	1.75	2.33 <sup>1</sup> <sub>3</sub>	2.91 <sup>2</sup> <sub>3</sub>	.05 <sup>5</sup> <sub>6</sub>	.11 <sup>2</sup> <sub>3</sub>	.17 <sup>1</sup> <sub>3</sub>	.23 <sup>1</sup> <sub>3</sub>	.29 <sup>1</sup> <sub>6</sub>	.35	.40 <sup>5</sup> <sub>6</sub>	.46 <sup>2</sup> <sub>3</sub>	.52 <sup>1</sup> <sub>3</sub>
4.00	.66 <sup>2</sup> <sub>3</sub>	1.33 <sup>1</sup> <sub>3</sub>	2.00	2.66 <sup>2</sup> <sub>3</sub>	3.33 <sup>1</sup> <sub>3</sub>	.06 <sup>2</sup> <sub>3</sub>	.13 <sup>1</sup> <sub>3</sub>	.20	.26 <sup>2</sup> <sub>3</sub>	.33 <sup>1</sup> <sub>3</sub>	.40	.46 <sup>2</sup> <sub>3</sub>	.53 <sup>1</sup> <sub>3</sub>	.60
4.50	.75	1.50	2.25	3.00	3.75	.07 <sup>1</sup> <sub>3</sub>	.15	.22 <sup>1</sup> <sub>3</sub>	.30	.37 <sup>1</sup> <sub>3</sub>	.45	.52 <sup>1</sup> <sub>3</sub>	.60	.67 <sup>1</sup> <sub>3</sub>
5.00	.83 <sup>1</sup> <sub>3</sub>	1.66 <sup>2</sup> <sub>3</sub>	2.50	3.33 <sup>1</sup> <sub>3</sub>	4.16 <sup>2</sup> <sub>3</sub>	.08 <sup>1</sup> <sub>3</sub>	.16 <sup>2</sup> <sub>3</sub>	.25	.33 <sup>1</sup> <sub>3</sub>	.41 <sup>2</sup> <sub>3</sub>	.50	.58 <sup>1</sup> <sub>3</sub>	.66 <sup>2</sup> <sub>3</sub>	.75
5.50	.91 <sup>2</sup> <sub>3</sub>	1.83 <sup>1</sup> <sub>3</sub>	2.75	3.66 <sup>2</sup> <sub>3</sub>	4.58 <sup>1</sup> <sub>3</sub>	.09 <sup>1</sup> <sub>3</sub>	.18 <sup>1</sup> <sub>3</sub>	.27 <sup>1</sup> <sub>3</sub>	.36 <sup>2</sup> <sub>3</sub>	.45 <sup>5</sup> <sub>6</sub>	.55	.64 <sup>5</sup> <sub>6</sub>	.73 <sup>1</sup> <sub>3</sub>	.82 <sup>1</sup> <sub>3</sub>
6.00	1.00	2.00	3.00	4.00	5.00	.10	.20	.30	.40	.50	.60	.70	.80	.90
6.50	1.08 <sup>1</sup> <sub>3</sub>	2.16 <sup>2</sup> <sub>3</sub>	3.25	4.33 <sup>1</sup> <sub>3</sub>	5.41 <sup>2</sup> <sub>3</sub>	.10 <sup>5</sup> <sub>6</sub>	.21 <sup>2</sup> <sub>3</sub>	.32 <sup>1</sup> <sub>3</sub>	.43 <sup>1</sup> <sub>3</sub>	.54 <sup>1</sup> <sub>6</sub>	.65	.75 <sup>5</sup> <sub>6</sub>	.86 <sup>2</sup> <sub>3</sub>	.97 <sup>1</sup> <sub>3</sub>
7.00	1.16 <sup>2</sup> <sub>3</sub>	2.33 <sup>1</sup> <sub>3</sub>	3.50	4.66 <sup>2</sup> <sub>3</sub>	5.83 <sup>1</sup> <sub>3</sub>	.11 <sup>2</sup> <sub>3</sub>	.23 <sup>1</sup> <sub>3</sub>	.35	.46 <sup>2</sup> <sub>3</sub>	.58 <sup>1</sup> <sub>3</sub>	.70	.81 <sup>1</sup> <sub>3</sub>	.93 <sup>1</sup> <sub>3</sub>	1.05
7.50	1.25	2.50	3.75	5.00	6.25	.12 <sup>1</sup> <sub>3</sub>	.25	.37 <sup>1</sup> <sub>3</sub>	.50	.62 <sup>1</sup> <sub>3</sub>	.75	.87 <sup>1</sup> <sub>3</sub>	1.00	1.12 <sup>1</sup> <sub>3</sub>
8.00	1.33 <sup>1</sup> <sub>3</sub>	2.66 <sup>2</sup> <sub>3</sub>	4.00	5.33 <sup>1</sup> <sub>3</sub>	6.66 <sup>2</sup> <sub>3</sub>	.13 <sup>1</sup> <sub>3</sub>	.26 <sup>2</sup> <sub>3</sub>	.40	.53 <sup>1</sup> <sub>3</sub>	.66 <sup>2</sup> <sub>3</sub>	.80	.93 <sup>1</sup> <sub>3</sub>	1.06 <sup>2</sup> <sub>3</sub>	1.20
8.50	1.41 <sup>2</sup> <sub>3</sub>	2.83 <sup>1</sup> <sub>3</sub>	4.25	5.66 <sup>2</sup> <sub>3</sub>	7.08 <sup>1</sup> <sub>3</sub>	.14 <sup>1</sup> <sub>3</sub>	.28 <sup>1</sup> <sub>3</sub>	.42 <sup>1</sup> <sub>3</sub>	.56 <sup>2</sup> <sub>3</sub>	.70 <sup>5</sup> <sub>6</sub>	.85	.99 <sup>1</sup> <sub>6</sub>	1.13 <sup>1</sup> <sub>3</sub>	1.27 <sup>1</sup> <sub>3</sub>
9.00	1.50	3.00	4.50	6.00	7.50	.15	.30	.45	.60	.75	.90	1.05	1.20	1.35
9.50	1.58 <sup>1</sup> <sub>3</sub>	3.16 <sup>2</sup> <sub>3</sub>	4.75	6.33 <sup>1</sup> <sub>3</sub>	7.91 <sup>2</sup> <sub>3</sub>	.15 <sup>5</sup> <sub>6</sub>	.31 <sup>2</sup> <sub>3</sub>	.47 <sup>1</sup> <sub>3</sub>	.63 <sup>1</sup> <sub>3</sub>	.79 <sup>1</sup> <sub>6</sub>	.95	1.10 <sup>5</sup> <sub>6</sub>	1.26 <sup>2</sup> <sub>3</sub>	1.42 <sup>1</sup> <sub>3</sub>
10.00	1.66 <sup>2</sup> <sub>3</sub>	3.33 <sup>1</sup> <sub>3</sub>	5.00	6.66 <sup>2</sup> <sub>3</sub>	8.33 <sup>1</sup> <sub>3</sub>	.16 <sup>2</sup> <sub>3</sub>	.33 <sup>1</sup> <sub>3</sub>	.50	.66 <sup>2</sup> <sub>3</sub>	.83 <sup>1</sup> <sub>3</sub>	1.00	1.16 <sup>2</sup> <sub>3</sub>	1.33 <sup>1</sup> <sub>3</sub>	1.50
10.50	1.75	3.50	5.25	7.00	8.75	.17 <sup>1</sup> <sub>3</sub>	.35	.52 <sup>1</sup> <sub>3</sub>	.70	.87 <sup>1</sup> <sub>3</sub>	1.05	1.22 <sup>1</sup> <sub>3</sub>	1.40	1.57 <sup>1</sup> <sub>3</sub>
11.00	1.83 <sup>1</sup> <sub>3</sub>	3.66 <sup>2</sup> <sub>3</sub>	5.50	7.33 <sup>1</sup> <sub>3</sub>	9.16 <sup>2</sup> <sub>3</sub>	.18 <sup>1</sup> <sub>3</sub>	.36 <sup>2</sup> <sub>3</sub>	.55	.73 <sup>1</sup> <sub>3</sub>	.91 <sup>2</sup> <sub>3</sub>	1.10	1.28 <sup>1</sup> <sub>3</sub>	1.46 <sup>2</sup> <sub>3</sub>	1.65
11.50	1.91 <sup>2</sup> <sub>3</sub>	3.83 <sup>1</sup> <sub>3</sub>	5.75	7.66 <sup>2</sup> <sub>3</sub>	9.58 <sup>1</sup> <sub>3</sub>	.19 <sup>1</sup> <sub>3</sub>	.38 <sup>1</sup> <sub>3</sub>	.57 <sup>1</sup> <sub>3</sub>	.76 <sup>2</sup> <sub>3</sub>	.95 <sup>5</sup> <sub>6</sub>	1.15	1.34 <sup>1</sup> <sub>6</sub>	1.53 <sup>1</sup> <sub>3</sub>	1.72 <sup>1</sup> <sub>3</sub>
12.00	2.00	4.00	6.00	8.00	10.00	.20	.40	.60	.80	1.00	1.20	1.40	1.60	1.80
13.00	2.16 <sup>2</sup> <sub>3</sub>	4.33 <sup>1</sup> <sub>3</sub>	6.50	8.66 <sup>2</sup> <sub>3</sub>	10.83 <sup>1</sup> <sub>3</sub>	.21 <sup>2</sup> <sub>3</sub>	.43 <sup>1</sup> <sub>3</sub>	.65	.86 <sup>1</sup> <sub>3</sub>	1.08 <sup>1</sup> <sub>6</sub>	1.30	1.51 <sup>2</sup> <sub>6</sub>	1.73 <sup>1</sup> <sub>3</sub>	1.95
14.00	2.33 <sup>1</sup> <sub>3</sub>	4.66 <sup>2</sup> <sub>3</sub>	7.00	9.33 <sup>1</sup> <sub>3</sub>	11.66 <sup>2</sup> <sub>3</sub>	.23 <sup>1</sup> <sub>3</sub>	.46 <sup>2</sup> <sub>3</sub>	.70	.93 <sup>1</sup> <sub>3</sub>	1.16 <sup>2</sup> <sub>3</sub>	1.40	1.63 <sup>1</sup> <sub>3</sub>	1.86 <sup>2</sup> <sub>3</sub>	2.10
15.00	2.50	5.00	7.50	10.00	12.50	.25	.50	.75	1.00	1.25	1.50	1.75	2.00	2.25
16.00	2.66 <sup>2</sup> <sub>3</sub>	5.33 <sup>1</sup> <sub>3</sub>	8.00	10.66 <sup>2</sup> <sub>3</sub>	13.33 <sup>1</sup> <sub>3</sub>	.26 <sup>2</sup> <sub>3</sub>	.53 <sup>1</sup> <sub>3</sub>	.80	1.06 <sup>2</sup> <sub>3</sub>	1.33 <sup>1</sup> <sub>3</sub>	1.60	1.86 <sup>2</sup> <sub>3</sub>	2.13 <sup>1</sup> <sub>3</sub>	2.40
17.00	2.83 <sup>1</sup> <sub>3</sub>	5.66 <sup>2</sup> <sub>3</sub>	8.50	11.33 <sup>1</sup> <sub>3</sub>	14.16 <sup>2</sup> <sub>3</sub>	.28 <sup>1</sup> <sub>3</sub>	.56 <sup>2</sup> <sub>3</sub>	.85	1.13 <sup>1</sup> <sub>3</sub>	1.41 <sup>2</sup> <sub>3</sub>	1.70	1.98 <sup>1</sup> <sub>3</sub>	2.26 <sup>2</sup> <sub>3</sub>	2.55
18.00	3.00	6.00	9.00	12.00	15.00	.30	.60	.90	1.20	1.50	1.80	2.10	2.40	2.70
19.00	3.16 <sup>2</sup> <sub>3</sub>	6.33 <sup>1</sup> <sub>3</sub>	9.50	12.66 <sup>2</sup> <sub>3</sub>	15.83 <sup>1</sup> <sub>3</sub>	.31 <sup>2</sup> <sub>3</sub>	.63 <sup>1</sup> <sub>3</sub>	.95	1.26 <sup>2</sup> <sub>3</sub>	1.58 <sup>1</sup> <sub>6</sub>	1.90	2.21 <sup>2</sup> <sub>6</sub>	2.53 <sup>1</sup> <sub>3</sub>	2.85
20.00	3.33 <sup>1</sup> <sub>3</sub>	6.66 <sup>2</sup> <sub>3</sub>	10.00	13.33 <sup>1</sup> <sub>3</sub>	16.66 <sup>2</sup> <sub>3</sub>	.33 <sup>1</sup> <sub>3</sub>	.66 <sup>2</sup> <sub>3</sub>	1.00	1.33 <sup>1</sup> <sub>3</sub>	1.66 <sup>2</sup> <sub>3</sub>	2.00	2.33 <sup>1</sup> <sub>3</sub>	2.66 <sup>2</sup> <sub>3</sub>	3.00

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